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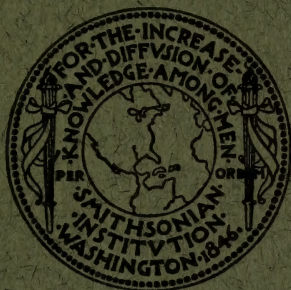
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BUREAU OF AMERICAN ETHNOLOGY
BULLETIN 186

ANTHROPOLOGICAL PAPERS

Numbers 63-67

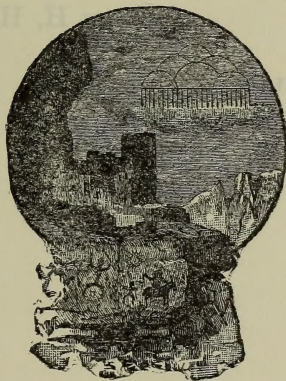


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LETTER OF TRANSMITTAL

SMITHSONIAN INSTITUTION,
BUREAU OF AMERICAN ETHNOLOGY

Washington, D.C., December 27, 1961.

SIR: I have the honor to submit the accompanying manuscripts, entitled "Tarqui, An Early Site in Manabí Province, Ecuador," by Matthew W. and Marion Stirling; "Blackfoot Indian Pipes and Pipemaking," by John C. Ewers; "The Warihio Indians of Sonora-Chihuahua: An Ethnographic Survey," by Howard Scott Gentry; "The Yaqui Deer Dance: A Study in Cultural Change," by Carleton Stafford Wilder; and "Chippewa Mat-Weaving Techniques," by Karen Daniels Petersen; and to recommend that they be published as a bulletin of the Bureau of American Ethnology.

Very respectfully yours,

FRANK H. H. ROBERTS, Jr.,
Director.

DR. LEONARD CARMICHAEL,
Secretary, Smithsonian Institution.

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SMITHSONIAN INSTITUTION
Bureau of American Ethnology
Bulletin 186

Anthropological Papers, No. 63

TARQUI, AN EARLY SITE IN MANABÍ PROVINCE,
ECUADOR

By MATTHEW W. and MARION STIRLING

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TARQUI, AN EARLY SITE IN MANABÍ PROVINCE, ECUADOR

BY MATTHEW W. and MARION STIRLING

INTRODUCTION

During the course of an archeological reconnaissance of Ecuador in the summer of 1957 under the auspices of the National Geographic Society and the Smithsonian Institution, a stratigraphic trench was excavated at Tarqui near the town of Manta in the Province of Manabí. This report describes the work.

Small test digs were also made on Cerro de Hojas, one of the famous "stone seat" sites nearby, and at La Tolita on the coast of Esmeraldas Province.

These three sites represent important cultural developments for the Ecuadorian coast, so radiocarbon dates were secured for each.

The Tarqui site belongs to the "Bahia de Caraquez" culture, a florescent period of the Late Formative. It gave a date of 2170 ± 200 years (213 ± 200 B.C.).

The Cerro de Hojas site, made familiar by the work of Saville, belongs to the "Manteño" culture. Our excavation in the center of one of the stone corrals produced charcoal which gave a date of 560 ± 200 (A.D. 1397 ± 200) (see pl. 2, *b*). There is a brief appendix (p. 27) in this work describing the potsherds from this dig.

At La Tolita we excavated one of the so-called pottery "tube" burials of the Atacames period. This contained a typical Atacames figurine (pl. 18, *b*), and charcoal which gave a date of 1690 ± 200 (A.D. 267 ± 200).

La Tolita is famous for the large amount of gold work that has been found there, and because its ceramics bear a close resemblance to those of Middle America.

The radiocarbon determinations were made by Dr. H. R. Crane, of the University of Michigan Laboratory.

Throughout the expedition we were assisted by Woodbridge M. Williams, photographer and foreign editorial staff member of the National Geographic Society.

The work was greatly facilitated by the wholehearted cooperation of Sr. Carlos Zevallos Menendez, Presidente, Casa de la Cultura Ecuatoriana, Nucleo de Guayas, who granted permission for the project and gave us all assistance.

We are also under deep obligation to Sr. Emilio Estrada, director of the Museo Arquelógico "Victor Emilio Estrada" of Guayaquil, who not only aided us with his knowledge of Ecuadorian archeology but gave us practical assistance in the way of transportation and the like.

The work throughout was made pleasant by the interest and hospitality of many other members of the Casa de la Cultura, who are doing so much to further science in Ecuador.

We are also obligated to Sr. Pedro Balda, a merchant of Manta and the owner of the Tarqui site, who generously gave us permission to excavate on his property. Sr. Emilio Bowen of Manta, whose knowledge of the region was of great help, aided us in many other ways.

Through the auspices of Emilio Estrada we secured the services of Felix Martinez, who acted as our work foreman at Tarqui. Our work crew consisted of eight men recruited locally.

We hired a large vacant building on the beach at Tarqui for use as a field laboratory. Although our excavation was relatively small, the sherd yield was so large that we required the services of four women to act as sherd washers and two boys as water carriers.

The Tarqui site (MA-1) is located midway between Tarqui and Estero, two small fishing villages just east of the town of Manta. The complete site lies on the dunes just back of the beach and extends for a quarter of a mile between the two towns. It appears to be between 50 and 75 yards wide. In most places the sand has drifted over the site, burying it from 2 to 20 feet deep.

The area which we selected for excavation was free from overburden and was on fairly level ground on the east side of a small dry ravine which had cross-sectioned the deposit at that point.

This section revealed a hard white sterile layer of caliche some 35 cm. thick and about 125 cm. below the surface, separating the upper and lower sherd-bearing levels (pl. 2, *a*).

We laid out a trench on the site, extending 6 meters E-W and 3 m. N-S. The deposit was much more compact than we had expected, and picks were needed to break the soil in digging. The occupation debris continued to a depth of 4 m. 70 cm. (approximately 15 feet).

The first meter consisted of well compacted, rather dry earth and sand. Under this was a layer 40 cm. thick of hard moist sand, which lay on top of the hard white deposit of caliche. The latter was completely sterile and was apparently a deposit that had formed in a pond.

At about 2 m. 50 cm. there began a layer of hard, dry powdery sand. Sherds were present in abundance throughout, except for the caliche layer, where they were entirely absent, and for some 40 cm. below it, where they were scarce. Indications are that this portion of the site was inundated for a while, causing its temporary abandonment. Shells were surprisingly scarce except in a small area near the surface at the south wall of the trench. Animal and fish bones were also relatively rare. Those which we did find were well preserved, so their scarcity was not the result of decomposition.

The trench was dug in 20-cm. levels, the material in each layer being kept separate. The material between 80 and 125 cm. was grouped in one level since the lower 35 cm. of this consisted of the completely sterile caliche layer. A new series of 20-cm. levels was begun at 125 cm., the base of the caliche.

Considering the depth of the deposit, we had expected to find significant stratigraphical changes, especially since the lower part of the deposit was so clearly separated from the upper by the caliche layer.

However, it appeared in the field that the material was the same throughout the trench. This impression was later verified by statistical studies after the collection had been examined in Washington.

Sherd counts giving the stratigraphic occurrence of various pottery types and features are shown in table 1 (p. 25). The same kind of data is shown for the principal figurine types, ocarinas, and stemmed cups in table 2 (p. 26).

Although the pottery falls into a number of distinct types and there are at least six relatively abundant figurine types, including both hollow and solid handmade, and hollow and solid moldmade, nevertheless all occur side by side throughout the 15-foot depth of the excavation. We could not see that there was any significant increase or decrease in the relative abundance of any given pottery or figurine type according to depth.

Artifacts of stone, bone, and shell were not abundant as compared with the ceramics.

Significant absences were spindle whorls and objects of metal.

Textile impressions on pottery and lumps of clay occurred rather frequently. The absence of spindle whorls may indicate the use of fibers that were not spun.

Nose rings are characteristically shown on the figurines; it seems likely that they were not of metal, although we found no artifact of any material that appeared to be a nose ring.

Clusters of charcoal occurred here and there throughout the excavation. One of the best samples from a depth of 2 m. 50 cm. was tested by Dr. H. R. Crane, of the University of Michigan Laboratory,

which, as already mentioned, yielded a date of 2170 ± 200 years (213 ± 200 B.C.).

Although the Tarqui deposit is thick, the uniformity of the material leads us to believe that it represents a single occupation, and that a date of 200 B.C. is probably a good average for the site.

The Bahia de Caraquez culture appears to represent a florescence of the Late Formative. The wide variety of ceramics and figurine types in association at the Tarqui site and its radiocarbon date make it a key site for the Ecuadorian coast.

There is very little evidence of influence from Peru, nor are the connections particularly close with the Atacames culture and La Tolita to the north, although there are some traits in common. Our radiocarbon date for La Tolita would indicate that its florescent period was approximately 500 years later than Tarqui.

Specific relationships with the Formative in Peru are not many, although many of the widespread generalized traits characteristic of the Formative throughout Middle America are present. The same may be said in comparing the material from the northern Ecuadorian coast, although the comparisons are somewhat closer.

The Guayas basin, although sharing a number of specific traits with Tarqui, has more differences than one might expect.

For the reader interested in comparative material, the bibliography herein covers previous archeological work done in the general vicinity. Basic to the understanding of the archeological periods of the region, are the publications of Emilio Estrada, who has established the major cultural sequences for the area.

POTTERY TYPES

Pottery making at Tarqui seems to have been little crystallized by tradition, and so seldom do wares, shapes, and decorative techniques combine in exclusive patterns that we have reduced our ware description to five basic types, to which are applied a rather surprising variety of decorative techniques. So great are the number of combinations used that it would be impractical to attempt to give them all in detail. The following are the most typical and cover the bulk of the ceramics.

With certain exceptions which have been noted, it should be remembered that almost any combination of traits might occur.

COARSE WARE

Coarse ware is a thick utilitarian ware which falls into two types: buff with rather soft tempering material, and brick red, which has a gritty temper and is somewhat harder. Otherwise the treatment of

the two is the same. Coarse ware is frequently fire blackened. Usually it is decorated with simple designs in red paint, bold incising, or both (pl. 5, *a*).

There is a variety of rim forms but the most frequent shapes are large short-necked ollas with everted rims or large bowls with slightly incurving rims (fig. 1). Some of the sherds were 2 cm. in thickness, and the orifice of one olla which could be measured was 30 cm. across.

SMOOTH WARE

Smooth ware is a rather fine paste ware, buff in color and may be painted dark gray to black, or red. It varies in thickness from 5 mm. to 1 cm. Generally the exteriors are smooth and the interiors rough, although the reverse also occurs. Paint, when used, is applied to the smooth surface. Sometimes there is additional decoration in the form of a row of engraved dots around the shoulder.

POLISHED WARE

Polished ware is composed of a paste similar to smooth plain, but the surface is slipped and polished, having a waxy feel to the touch. The slip is gray to black, or orange to red or brown. The vessels usually have a composite silhouette, frequently with notched and decorated rims, raised collars, notched shoulders or flanges, perforated rims, and engraved decoration. Any combination of these colors and decorative techniques may occur. Both pedestal bases and polypod supports are used.

The polishing is frequently of the striated or "pebble polished" type (pl. 7, *b*).

PLAIN RED ON BUFF

Plain red on buff is perhaps the most diagnostic ware at the site. It is relatively thin, crisp, and hard with a fine grit temper, and is light buff in color. The surface is slipped but unpolished. The red paint is rather carelessly applied in spots, bold lines, or bands in very simple designs, or is merely splashed on in irregular splotches. Typically, paint is applied to both interior and exterior, and almost invariably there is a band around the rim (pl. 8, *a*).

There is a wide variety of forms accompanying this combination; bowls with incurving or outcurving rims, shoulders, ring bases, pedestal bases, and polypod cylindrical or conical supports all occur with plain red on buff.

POLISHED RED ON BUFF

Polished red on buff is the same as plain red on buff except that the surface is polished, and the paint as a rule is applied with a little more care (pl. 8, *a*).

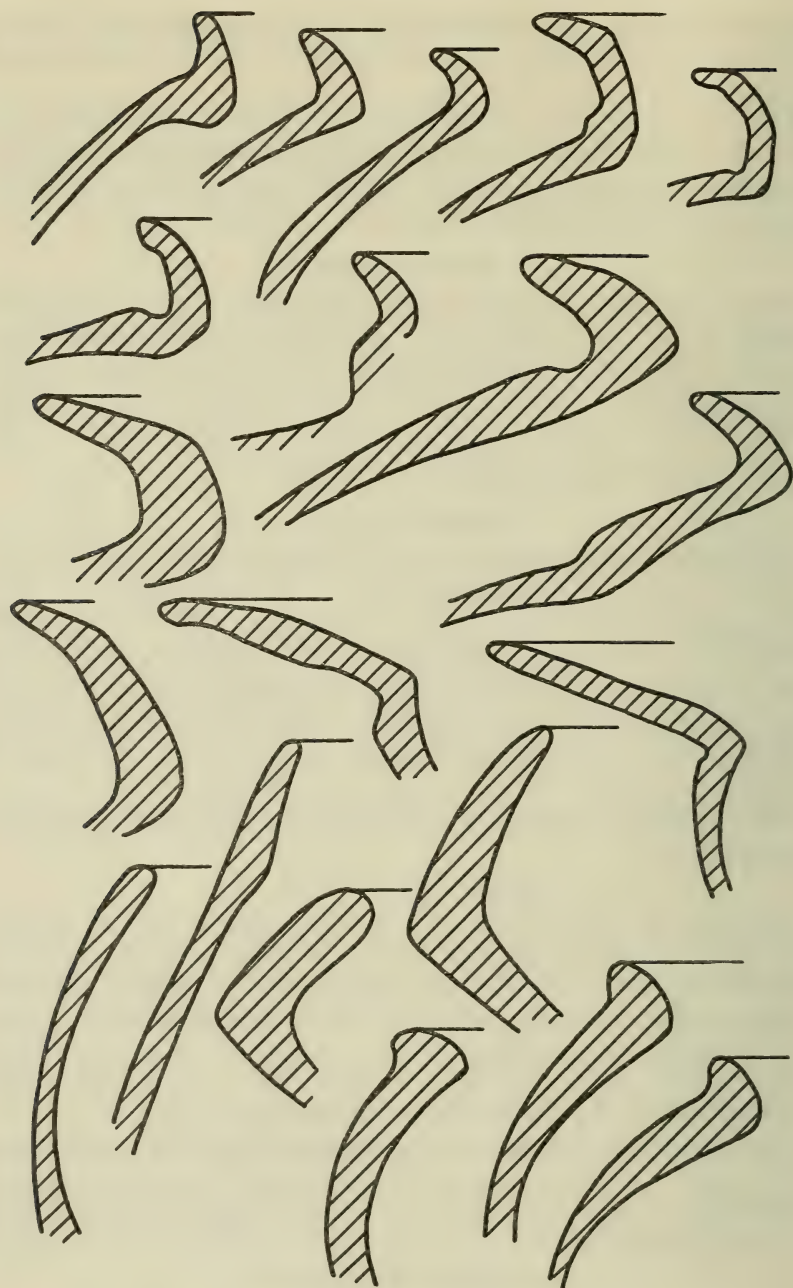


FIGURE 1.—Typical rim sections, coarse ware.

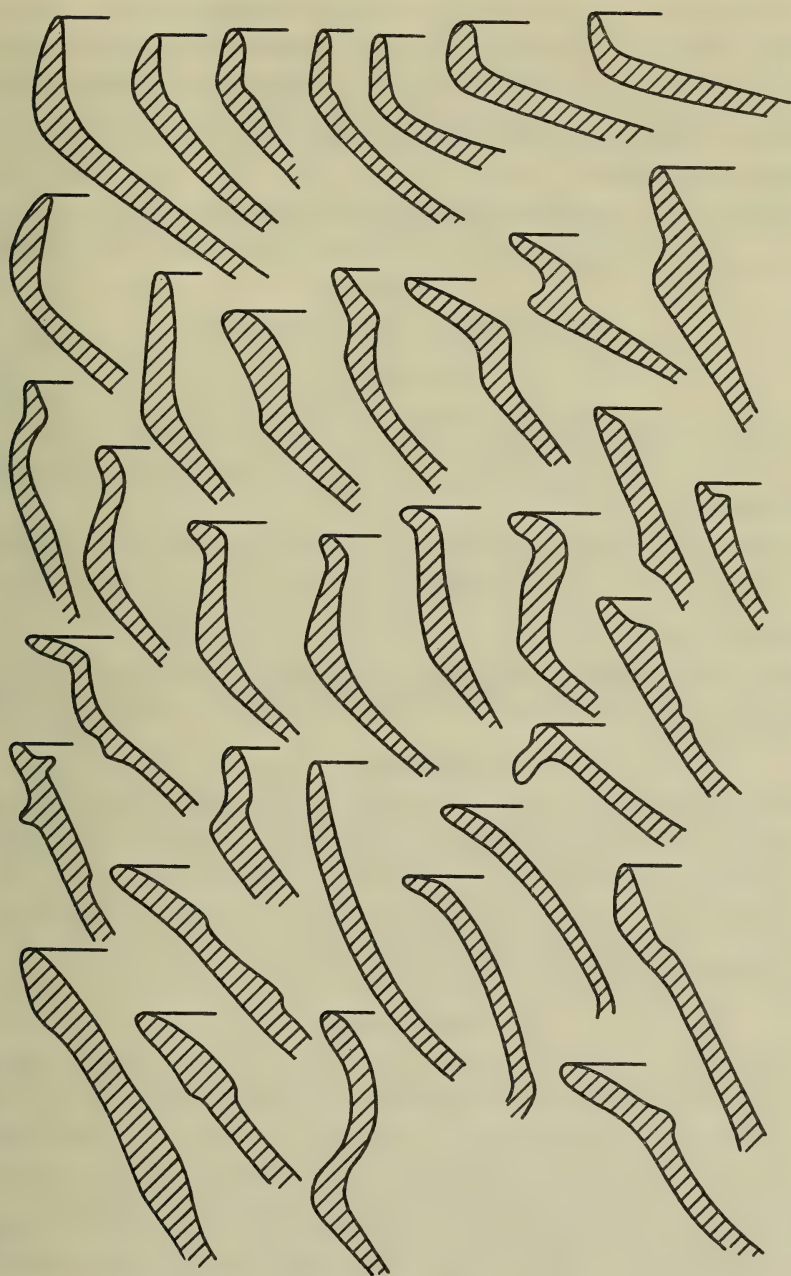


FIGURE 2.—Typical rim sections, smooth and polished ware.

As is the case with virtually all Tarqui ceramics, all sorts of hybrids occur in the red on buff wares. Sometimes the red areas are polished and the buff unpolished, or the interiors are polished and the exteriors unpolished. Occasionally the exterior is red on buff and the interior polished buff, brown, gray or black. The interiors sometimes are painted solid red.

Negative designs also occur on the red painted interiors.

One sherd was found with narrow zones of red outlined by engraved lines, on a buff base (pl. 3, *a*, 11).

DECORATIVE TECHNIQUES

MODELING

A sort of horizontal gadrooning occurs with some frequency. This produces a corrugated effect in which a series of concentric terraces surround the vessel (pl. 3, *a*). Luster paint is frequently applied to this ware.

Sometimes circular, hemispherical, or concentric nodes are applied to the outflaring rims of flanged vessels (pl. 3, *b*). Sharp shoulders occasionally are modeled into flanges which in turn are usually notched.

Rims are frequently modified by scalloping or terracing (pl. 3, *b*). In a few instances human faces were modeled on the shoulders of vessels (pl. 3, *a*).

NOTCHING

Notched rims and notched shoulders or flanges were produced by pressing with a sharp implement while the clay was soft. The various effects produced by this technique can best be seen in the illustrations (pls. 6, *a*, *b*; 7, *a*). Notching is very common at Tarqui and may be considered one of the diagnostic features of the site. It is found most frequently on red polished ware.

ENGRAVING

Engraved designs are very frequent and typical of the site. They are used on the smooth and polished wares, but are most common on the polished monochrome, gray to black, or red (pl. 4). Rectilineal designs are the general rule, although horizontal or vertical squiggled lines occur. In one instance the engraved figure of a bird, apparently a long-legged waterfowl, was on the inner surface of the outflaring rim of a large jar (pl. 4). This was the only attempt at representation found at Tarqui in a technique other than modeling.

Engraved lines are also used in zoning color areas. This occurs with red on buff and with polished black on dull black.

There are actually two types of engraving, fine and bold. The former was produced with a very sharp point rather lightly applied, while the latter was gouged out deeply with a somewhat wider tool. An interesting variant of the bold engraving is a polychrome technique wherein the deep lines are colored with alternate red, white, and yellow pigments. This is actually a five-color ware, since the rim and interior are orange, and the exterior is polished black. In some examples, the interior is also polished black (pl. 4, *b*).

INCISING

Incising has a very specialized application at Tarqui. It is used only on coarse plain ware (pl. 5, *a*) and to decorate the pedestal bases of red on buff vessels (pl. 5, *b*).

It is interesting to note that on these two types engraving techniques are never used.

In both cases the designs are boldly and carelessly applied. Zoned punctate areas occur occasionally.

PUNCTATION

Punctate designs are not particularly common. Zoned punctate areas occur with incising on the pedestal bases mentioned above and on coarse plain ware, but they rarely are used with the engraving technique.

Single punctate lines, running around the shoulder or below the rim, are fairly common. Sometimes these are true punctations formed by a sharp point while the clay was plastic, but in other cases they are produced by gouging out dots after the vessel was fired and polished.

PERFORATED DESIGNS

Perforations passing completely through the wall of the vessel are used as a decoration, sometimes on the rim but occasionally below the rim. These holes may be circular, triangular, or in the form of slits. They are often used in combination with rim notching. They are seen mainly on polished monochrome, but occur on polychrome as well (pl. 7, *a*).

INDENTATION

Fingernail indentations or marks similar to them are common on coarse plain ware. They are usually applied just below the rim (pl. 5, *a*).

PSEUDOCOILING

This type of decoration is represented by a few sherds from different vessels, found in the deeper levels of the trench. These sherds have

a highly polished dark red or polished black interior. The buff unpolished exterior is decorated by pushing up little mounds of the clay while plastic, with a chisel-shaped implement, giving the impression of a modified coil decoration (pl. 3, *a*).

This ware seems similar to specimens illustrated by Estrada (1958) which he calls *Machalilla corrugated*.

TEXTILE IMPRESSED

Textile impressions occur on some large moldmade figurines, on a few sherds, and on three lumps of burned clay which look as though they had been wrapped in a fabric and burned. However, apparently textile impression was not used as a decorative technique.

PAINTING

There has already been some mention of the simple use of paint. Red and black are the colors most frequently used.

Orange occasionally may be an accidental variation of red, but sometimes it is intentionally used with red as a contrasting color. Buff, sometimes approaching yellow, is a frequent slip color. Real yellow pigment was apparently never used on the surface of pottery vessels, but was applied frequently to figurines, stemmed cups, curved conical vessel supports, and as one of the colors used to fill engraved decorative lines.

White was also used, but it is rare.

Silver or rose-colored luster paint is one of the characteristic features of Tarqui. The silvery variety is found at other early sites in this general region.

In most instances the paint is rather carelessly slapped on. Even in polychrome or tricolor ware in which small element designs are used, the potters were not very meticulous in applying their pigments.

Negative or resist painting occurs but is not particularly abundant at the site.

Some of the more characteristic combinations follow:

Tricolor.—This is evidently the ware which Estrada calls *Bahia Tricolor*. It consists of red and black over orange or buff.

It falls into two types: the first, polished and painted on both interior and exterior, the other, polished and painted on the exterior only, the interior being left rough and undecorated (pl. 8, *b*).

One unique sherd was found in the deepest level of our trench. This was a thin, fine paste ware polished and painted on both sides with an elaborate design with scrolls, dots, and both curving and angular lines applied in narrow bands of orange and dark red. These bands in turn are outlined with black and red. The base color is

buff. A deeply notched flange runs around the exterior. Although the colors are similar, this appears to be an exotic piece and the ware itself is finer than the typical Tarqui polychrome (fig. 8, *b*).

Luster painting.—This curious thin, transparent application has a metallic luster and is either silver or rose tinted. It is usually seen in broad vertical or horizontal lines on the interior near the rim. Other designs consist of round dots or bold hour-glass figures (pl. 9, *a*).

It is found typically on polished black, polished red, and polished buff. Sometimes it is on polished black with polished red exterior or polished black with unpolished buff exterior or polished black, both exterior and interior. In at least one instance luster painting was combined with red and black on buff.

Negative painting.—This occurs on both red and black polished wares and sometimes in combination with red and buff on black and red. The color under the resist application is usually buff or white (pl. 17, *a*).

Red on white.—This occurs on coarse ware coated with a white wash over which bold and rather crude designs in red are applied. Two rim sherds of this ware were found, one near the surface, the other at a depth of 385 cm. Although identical in appearance, they are obviously from different vessels (pl. 3, *a*, 5, 6).

Black on red.—This is used on both smooth and polished ware. The black designs are applied over the red.

Red on black.—This is the reverse of the above, the red designs being applied on the black surface.

Red, orange, and black on buff.—Similar to tricolor, this combination is usually painted on a smooth exterior, the inside being rough and unpainted.

Sometimes the painting is on the smooth interior, in which case the exterior is usually rough and undecorated. Another variant is with the three colors on the interior, with the exterior also smooth and painted solid red. Sometimes there are resist stripes on this ware. It may be possible that these stripes are made by scraping off the slip rather than by a resist technique (pl. 17, *a*).

Black on buff.—This consists of a buff exterior with a black interior, the black extending over the rim.

White on black.—This is on polished ware, sometimes on both sides, sometimes on the polished interior, with the exterior plain and unpolished.

Black and red on buff.—This is polished on both sides; the designs are applied to the interior. The exterior is solid red.

Light brown on dark brown.—Only a few sherds were found of this highly polished ware. The design, consisting of broad horizontal bands, is on the exterior. The interior is light gray and unpolished. This might be an exotic type.

Dull black on polished black.—This is reminiscent of the technique used in San Ildefonso Pueblo, New Mexico. Typically, broad unpolished zones are left below the rim.

A variation is to create narrow zones outlined by engraved lines with the polished and unpolished areas alternating (pl. 9, *b*).

Pencil line.—This is used as a further embellishment on the dull black zones. Vertical or cross-hatched polished lines are applied by a stylus and look very much like pencil marks (pl. 9, *b*).

Dull red on polished red.—This is identical with the preceding technique, except that red instead of black is used. Pencil-line decoration is also used with it. The red combinations, however, are much more rare than the black.

VESSEL SUPPORTS

The majority of the pottery vessels appear to have been equipped with polypod supports, or with pedestal or ring bases. The various types used are described below.

Cylindrical supports.—These were the most abundant of the polypod supports, 213 being found in our trench. They consist of hollow cylinders, open at the base. Usually they expand toward the lower end. Although frequently used on smooth or polished wares, unlike the conical variety, the cylindrical supports are never polished and seldom smoothed. Normally they are buff or black in color (pl. 10, *a*).

Hollow conical.—These are the second most abundant type and appear to have been used on all kinds of smooth and polished ware. There is a certain amount of variation in form. Typically they are smoothed or polished and red or black in color. The majority taper evenly to a blunt point which sometimes terminates in a plane surface. A few are bulbous in shape. All have a slit or a round hole in the side. Rattles were not used. One or two have a loose inclusion which is probably accidental. They seem to have been used normally on shallow bowls. We recovered 187 supports of this type but were unable to determine how many were used on a single vessel (pl. 10).

Solid curved supports.—These look something like modified conical supports with curving points, but they are solid and lack the ventilation holes. They are never polished, but at least one specimen was decorated with red and yellow paint (pl. 10, *b*).

Solid rectangular supports.—These consist of square slabs, flat and somewhat longer than they are broad. Only five were found.

Solid conical and cylindrical.—A few solid conical and cylindrical supports were found. They were small, carelessly made, and probably do not constitute types (pl. 10, *a*).

Loop supports.—The few examples found had been attached to rather large bowls with buff exteriors and smooth black interiors. One specimen had a small rectangular protuberance at the terminus (pl. 10, *a*).

Effigy supports.—Effigy supports are most frequently modifications of the solid curved type, on which are added "coffee-bean" eyes, nose, and mouth and sometimes a pair of arms (pl. 10, *b*). Circular tabs are sometimes applied to indicate the features in place of the coffee-bean eyes (pl. 10, *b*).

In only one instance was a hollow conical support modified to effigy form (pl. 10, *b*).

In a few cases the supports were simple but complete effigies with legs. These are rather flat and broad. One example is shown with a nose ring (pl. 10, *b*).

Estrada shows an interesting distribution chart for most of the polypod types of supports (Estrada, 1957, c, chart 14).

Pedestal bases.—These are fairly common. Both the tall slender and low broad forms were used. They are most frequent with smooth red and red on buff wares. In the latter case they are normally decorated with boldly incised geometric designs (pl. 5, *b*).

Ring bases.—Ring bases are sometimes used, and occasionally may be 2 cm. or more in height (fig. 3).

FIGURINES

One of the striking features of the Tarqui site is the abundance of figurines. From a trench 6 m. long, 3 m. wide, and 4 m. 70 cm. deep, we recovered 1,003 figurines and figurine fragments.

These could be classified into six major types which we have indicated by the letters A to F. Although distinct in style, there is a certain relationship between the types. Some are definitely hybrid, and certain characteristics occasionally are shared by several. Miniature forms are frequent in all types except "F."

The great majority of the figurines are in human form, both male and female, but there are a few animal and bird effigies as well. The majority of the animals appear to be dogs with long bodies and short legs. The birds are in tripod form with the tail and two legs forming the supports. Both hollow and solid animal figurines were found.

Complete specimens were relatively scarce.

Of the large number of human figurines, only three represent seated individuals; all the rest are shown in a static, standing position. There

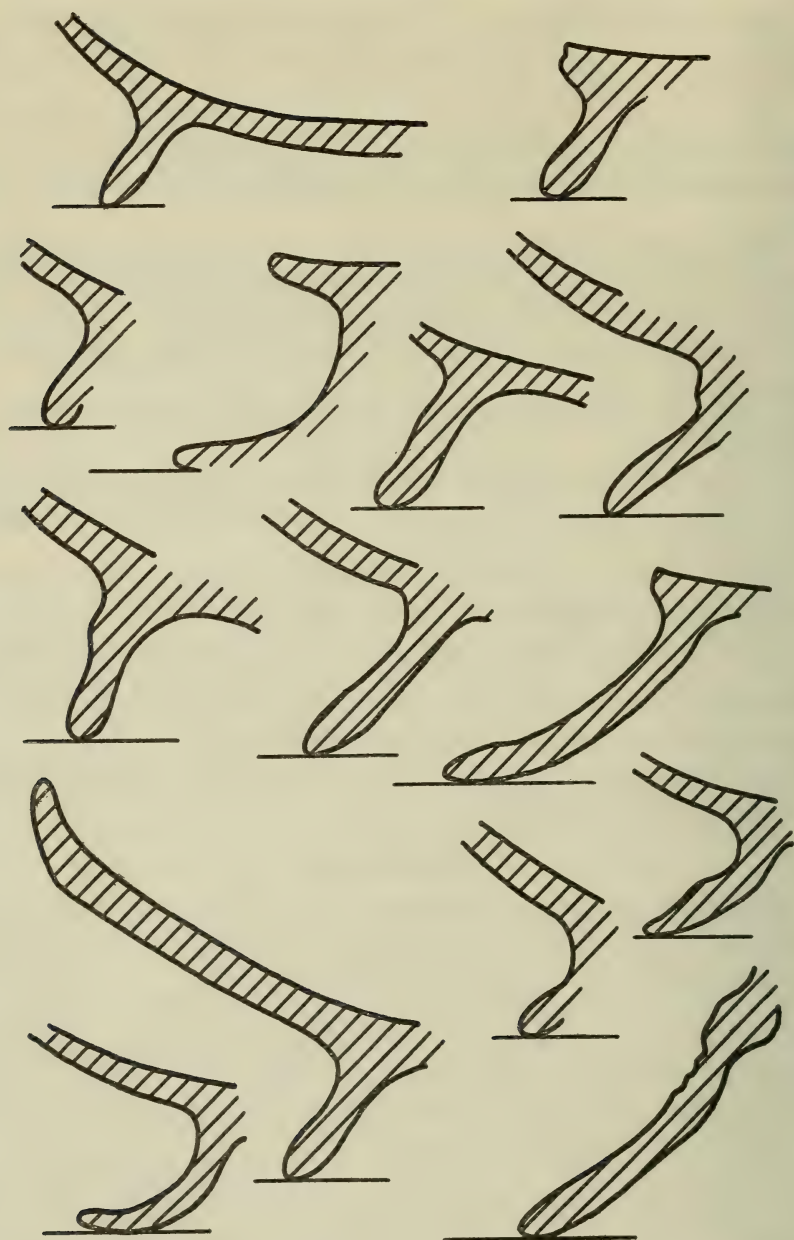


FIGURE 3.—Cross sections of ring and pedestal base supports.

are also a number of aberrant specimens which do not fall into the six major types.

Type A appears to be similar to what Estrada calls the "Estero" type. Our type B is Estrada's "Bahia" type. Type C seems to be what he calls "La Plata," and type F is his "giant modeled." As with the other ceramics, all figurine types occurred from top to bottom in our trench with no significant differences in proportion between the shallow and the deep parts of the excavation. Most abundant were types A (122) and E (764).

The apparent greater abundance of type E is due to the fact that being larger and of thin hollow construction they broke into a much larger number of fragments. The figure for type A, on the other hand, is probably close to the actual number of figurines represented.

Detailed descriptions of the various types follow. However, the reader will get the best impression of them by studying the illustrations.

Type A.—These are small, flat, solid, handmade figurines with coffee-bean eyes. The backs are plain except for occasional surface decoration, and the back of the head is typically concave. The nose is thin, arched, and very prominent. In a few instances, the nostrils are shown. Usually a nose ring is worn. The eyes and mouth are formed by applying round or oval tabs of clay in which is pressed a transverse slit made by a sharp-edged instrument. The body proportions vary from short to long. The crotch is U-shaped and the legs are relatively short, sometimes bowed. The legs terminate in a blunt point without forming the feet. The arms are short and normally hang down at an angle from the sides, with the hands suppressed. Sometimes the arms cross the chest, and fingers are indicated by incisions. All type A figurines are represented in a static, standing position.

Males and females are about equally abundant. The bodies of the males are usually longer than those of the females. Frequently the arms of the females are represented as supporting the breasts.

No clothing is represented except an occasional simple forehead band and articles of adornment such as nose rings, bead and band necklaces, multiple string necklaces, and, rarely, cheek plugs. Hair or headdress is never indicated, the top of the head usually terminating in a rectanguloid manner.

The bodies of both sexes are frequently tattooed with small incisions, sometimes on one side of the body only. Occasionally this tattooing extends over the back. Many are painted, usually red and in a variety of patterns. Normally painting is confined to the head and the upper part of the body, as a rule extending around the back.

Frequently the lower part of the nose is pierced laterally with a very small hole, evidently for inserting a detachable nose ornament in lieu of the usual modeled nose ring.

The ears are sometimes punctured with a row of small holes which do not penetrate all the way through (pls. 12, 13).

Type B.—These show a relationship to type A but in general are considerably larger in size. They are moldmade, solid and flat with plain backs.

The eyes are raised circles or ovals. Ears are indicated by from two to eight raised circular tabs. The noses are thin, arched and prominent. The base of the nose extends well above the eyes. Usually nose rings are worn, but occasionally the nose is in the form of a loop, evidently for the purpose of adding a detachable nose ring.

The mouth is a narrow raised tab under the nose, with a transverse slit. The chin and mouth are small in proportion to the rest of the face.

As with type A, male and female figures are equally abundant. The genitalia are never indicated, though no clothing is worn. The female breasts are always formed. The male figures wear a bead necklace with a pendant hanging on the chest. Usually they also have bracelets and armlets.

The females wear a semicircular bead necklace like that of the males, but without the pendant. The males wear a belt around the stomach; the females do not. Females are sometimes shown with the hands crossed on the chest.

Frequently type B figurines are painted with red, white, and yellow paint, the yellow being used on the face. It is common for the upper half of the body to be painted red, this painting extending over the back.

There are several variants of this type. One is shown with a raised headband, while another is a man playing panpipes.

Little attention is paid to modeling the legs and feet. Normally the arms are shown hanging at the sides, but extending at an angle from the body. The legs are separated.

Some of the larger figurines are made from a hard terra-cotta-like material, with the backs perfectly flat as though modeled on a board (pl. 14).

Type C.—These are solid moldmade figurines which are intermediate in size between types A and B. They are relatively flat and the backs are plain. They are typically represented as standing, but the only three seated figurines found were of this type.

The ears are represented as decorated with circular ear spools or with small circular tabs. A few have nose rings but the majority do

not. Although the legs are represented as separated slightly, the space between is closed. A small form of type C has a perforation through this connecting web as though for inverted suspension. The broad upper part of the head is modeled more like type B than type A.

Typically a bead necklace is worn. Usually the eyes are realistically modeled to show the lids and eyeballs, although a variant type has round eyes. One specimen is shown grasped in a giant hand as though it were a doll.

The features are on the whole rather realistic and in proportion, as contrasted with types A and B, which suggest caricatures (pl. 15).

Type D—These are semisolid and moldmade. They are of heavy clay with a small hollow, or cylindrical, hole in the center. The eyes are of the coffee-bean type, or oval with horizontal slits. The ears extend from the sides of the head and are decorated with three circular tabs arranged in the form of a triangle. The nose is arched and moderate in size, with a nose ring. They also wear bead necklaces.

The arms are represented as akimbo, but in the form of a loop.

There is a small, circular ventilation hole in the center top of the head.

They were sometimes rather gayly painted with red, yellow, black, and white paint.

Some type C figurines resemble type D in that they are semisolid (pl. 16, *a*).

Type E.—These are hollow moldmade figures which vary considerably in size (pl. 16, *b*). Typically they are larger than type B, but this is not always so. These figures are the most abundant type at the Tarqui site. As a rule, the features are modeled more realistically than in the preceding types, but the legs and feet are carelessly done.

The ears are shown with small circular tabs on the rims and a small circular ear spool in the lobe of the ear. Frequently nose rings are represented. The faces are sometimes painted in red, yellow, black, and white, and several fragments have negative paintings on the legs and body. Perhaps all were painted originally, but most of them apparently have lost the paint. A fairly common type is shown holding a baton diagonally across the chest.

A curious and particularly diagnostic internal structural feature consists of two perforated cylindrical supports joining the buttocks and abdomen, leaving two holes on the exterior of the figurine, both front and rear. The internal cylinders are also perforated laterally with small holes. These may have acted as supports to keep the body from collapsing while the clay was soft before firing. Estrada illustrates a figure from Choné which apparently has this feature (Estrada, 1957 c, fig. 92).

Type F.—These are large, heavy, hollow, and handmade figures, some almost one-quarter life size. They were elaborately decorated with applique and further ornamented with red and black paint.

Although we recovered nine pieces, they were too fragmentary to give a good idea of the nature of the complete specimens. The one human head fragment found was wearing a large well modeled circular ear spool, painted red. There was also a portion of a jaguar or puma head with projecting fangs, the only representation of this animal that we found (pl. 11, *a*).

Aberrant figurines.—A few specimens were found which do not fit in with the above-described types. On the surface of the site was found the example illustrated in figure 4 and plate 19, *a*, 3. It is brownish buff in color, polished, and decorated with incised designs. It appears to represent an anthropomorphic deity rather than a person.

In the deepest level of the trench were found two solid, rather flat torsos, jet black and highly polished. The ware of these is similar

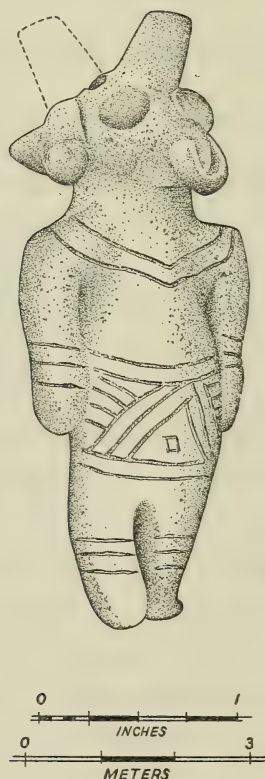


FIGURE 4.—Polished and incised figurine.

to a purchased specimen brought to us by a workman, which is illustrated in plate 19, *a*, 12.

Some figures with punctate eyes from the nearby Estero site are also illustrated (pl. 19, *b*). These are usually modeled under the rims of narrow-necked jars.

MISCELLANEOUS POTTERY ARTIFACTS

Stemmed cups.—One of the most abundant as well as one of the most puzzling artifacts at the Tarqui site were these curious little objects which we called “golf tees” because of their form. They consist of a small hemispherical cup from 2.5 cm. to 4 cm. in diameter, mounted on a pointed, bulbous stem about 2.5 cm. long (pl. 11, *b*). The majority are of buff ware, but some are black or gray.

It has been speculated that these are ear ornaments but this does not seem likely. The ear tabs shown on the figurines are considerably smaller and appear to be flat.

The “golf tees” are sometimes painted red or yellow, but they are not particularly well made or decorative. We recovered 108 from our excavation, so it would appear that they had some commonplace use.

Ocarinas.—A simple conical whistle or ocarina with two projecting hollow arms at the upper part was a characteristic artifact. These ocarinas are of unpolished buff ware and vary in length from 2.5 cm. to 6.5 cm. More than a dozen were found in our trench. Their appearance and construction are shown in figure 5.

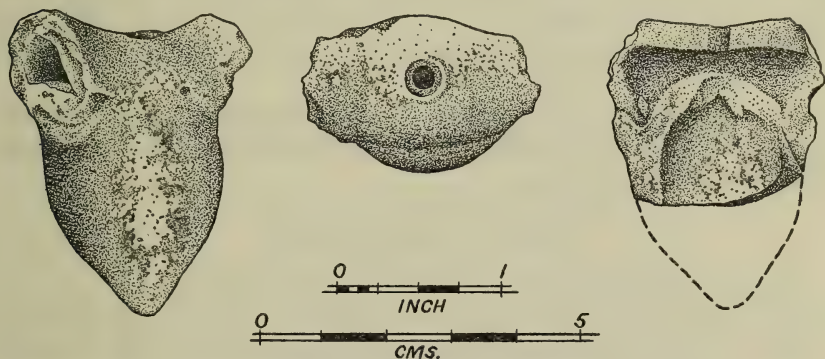


FIGURE 5.—Typical ocarina, showing internal construction.

Pottery “cradles”.—Parts of seven platformlike objects with raised, notched sides and four supports were found. At each end these objects have a perforated tab as though for attaching a string. One-half of a specimen had an arched loop extending from side to side.

One was painted with red and yellow paint. They vary from about 12 cm. to 20 cm. in length (pl. 11, *a*).

Estrada has speculated that these were cradles for figurines. We have no better suggestion to offer.

Textile-impressed lumps.—Three or four lumps of burned clay were covered with textile impressions, as though they had been wrapped in a fabric and burned.

Miniature goblets.—A few miniature vessels about 5 cm. in height, shaped like a stemmed champagne glass, were found. They were of thin unpainted buff ware.

Pottery disks.—Circular, unperforated disks 2 cm. to 5 cm. in diameter were made from potsherds.

Finger-grooved grater.—A single sherd of buff ware, representing this type of artifact, was found at a depth of 145 cm. This type of grater, which occurs abundantly at the nearby Estero site, is supposed to belong to a much later period (the Manteño), but we feel that its presence here should be mentioned (pl. 3, *a*).

STONE ARTIFACTS

Objects of stone were not particularly abundant. The most common were rather small rectangular whetstones made of fine-grained sandstone, and grooved abrading stones of the same material, evidently for awl sharpening (pl. 11, *b*).

Miscellaneous artifacts consisted of two small stone borers, several rubbing stones, two pieces of pumice, and a bright-green polished serpentine tubular bead. Obsidian flakes were fairly common, and there were a few flakes of white chalcedony and brown flint. A bright-blue waterworn pebble had evidently been picked up because of its color.

One fragment of well-carved, hard, fine-grained stone evidently was part of an animal figure. This single piece demonstrated at least real skill in stone carving.

SHELL ARTIFACTS

Among the shell artifacts were 3 or 4 small shell adzes or axes and 12 pearl shell rings which varied from 3.5 cm. to 6.5 cm. in diameter.

There was also a well-made disk-shaped shell bead 2 cm. in diameter which had been perforated by a conical drill operating from both sides, a perforated rectangular fragment of pearl shell, and an olivella shell sawed in half with a ground-planed surface on the upper portion through which a hole had been drilled.

TABLE 1.—*Stratigraphic sherd counts at Tarqui site*¹

Level	Coarse		Smooth		Polished		Polished red on buff		Luster		Engraved		Notched rim		Notched shoulder		Pencil line		Totals
	Count	Per-centage	Count	Per-centage	Count	Per-centage	Count	Per-centage	Count	Per-centage	Count	Per-centage	Count	Per-centage	Count	Per-centage	Count	Per-centage	
0-20	1,120	48	770	32	400	17	2	-----	5	-----	30	1.3	20	0.9	17	0.8	1	0.8	2,365
20-40	1,030	30	1,900	56	290	8	110	3.2	6	-----	28	1.8	32	.9	31	1.9	3	-----	3,430
40-60	1,310	45	1,190	40	220	7	94	3	15	0.5	45	1.5	24	.7	41	1.3	-----	-----	3,930
60-80	1,430	53	1,080	36	170	7	45	1.5	-----	-----	39	1.3	19	.6	26	1	-----	-----	2,709
80-125	1,390	39	470	49	51	5	49	8.2	10	-----	4	-----	2	-----	7	2.5	-----	-----	862
125-145	140	41	110	33	43	12	28	8	8	2.2	-----	-----	5	1.5	-----	2	-----	-----	342
145-165	100	36	150	53	16	5	8	3	3	1	4	1.4	-----	-----	2	.7	-----	-----	283
165-185	950	40	960	40	420	17	74	3	9	-----	-----	-----	12	-----	11	-----	-----	-----	2,437
185-205	1,060	48	690	31	250	11	110	5	40	1.8	27	1.2	20	.9	14	.6	1	-----	2,212
205-225	1,020	59	480	27	100	5	86	3.2	21	-----	23	-----	8	-----	11	-----	3	-----	1,752
225-245	990	50	710	36	130	7	64	4.8	25	1.3	21	1.3	10	.5	18	.9	-----	-----	1,979
245-265	910	53	560	32	110	6	53	4.5	11	.6	21	-----	9	.5	16	.9	-----	-----	1,720
265-285	1,150	66	400	23	85	3	79	4.5	16	.9	-----	-----	10	.5	9	.5	-----	-----	1,753
285-305	1,300	42	960	33	510	17	72	2.5	33	1.1	21	.7	20	.7	12	-----	-----	-----	2,928
305-325	1,320	46	980	34	410	14	86	3	38	1.3	29	1	16	.5	4	-----	1	-----	2,884
325-345	1,540	55	660	23	450	16	92	3.3	14	.5	29	1	14	.5	17	.6	-----	-----	2,816
345-365	910	58	400	26	91	6	82	5.2	27	1.7	27	1.7	14	.9	12	.7	-----	-----	1,563
365-385	1,180	48	820	33	310	12	84	3	30	1	18	.7	13	.5	10	-----	-----	-----	2,465
385-405	990	46	910	42	160	7	81	3	12	-----	6	-----	9	-----	6	-----	-----	-----	2,174
405-425	910	45	690	34	290	15	78	3.9	11	.6	16	-----	6	-----	8	-----	-----	-----	1,999
425-445	880	45	420	22	520	27	73	3.6	11	.5	-----	-----	9	-----	11	.5	-----	-----	1,940
445-465	220	42	110	21	140	27	26	5	10	2	7	1.3	6	1.2	6	1.2	-----	-----	1,525
Total or average	20,850	47.3	15,320	34.6	5,166	11.7	1,506	3.4	355	.8	417	.9	278	.6	295	.7	10	-----	44,197

¹ Tenths of percent were dropped in coarse, smooth, and polished to simplify chart. Percentage under 0.5 not entered.

The apex of a conch shell had been ground into a disk and two holes drilled in the upper portion. These holes penetrated only half-way through the rather thick shell. There were also several sawed-off sections of orange-colored spondylus shell (pl. 18, *a*).

BONE ARTIFACTS

A few bone awls, round in cross section, were found (pl. 18, *a*). There were also a polished bone tubular bead and a polished round piece of bone with a pointed stem attached which may have been a cheek or ear plug.

TABLE 2.—*Stratigraphic occurrence of figurines, ocarinas, and stemmed cups*

Level	Solid			Semi-solid, type D, mold-made	Hollow			Ocarinas	Stemmed cups
	Type A, hand modeled	Type B, mold-made	Type C, mold-made		Type E, mold-made	Type F, hand modeled monumental	Bird and dog figurines		
0-20.....	8	3		2	52			3	2
20-40.....	17				53	2	2	3	9
40-60.....	16	4	3		75			4	6
60-80.....	6	3	1		56		2		3
80-125.....	2	1	1	2	18				1
125-145.....	4	1		2	12				1
145-165.....	1				2				
165-185.....	4	2		5	44		1	1	1
185-205.....	1	4		2	36		1	2	
205-225.....	3	5	1		27			1	4
225-245.....	10	5	1	2	39	3		1	2
245-265.....	4	3		1	29	1	2		11
265-285.....	8				20				4
285-305.....	8	2	3	1	34	1	1	1	8
305-325.....	12	4	1	3	83			1	11
325-345.....	6	3		1	69		1	2	9
345-365.....	3	2	3		39				4
365-385.....	3	6	1		50	1		2	16
385-405.....	2				21			1	3
405-425.....					3	1			12
425-445.....	4				24				
445-465.....		1			2				1
Total.....	122	49	15	21	788	9	10	22	108

APPENDIX

DESCRIPTION OF POTSDHERDS FROM THE CERRO DE HOJAS SITE

In the process of making a small excavation for the purpose of obtaining charcoal at Cerro de Hojas, a small collection of potsherds was obtained. These were identified by Emilio Estrada as belonging to the Manteño culture. The type and number of each potsherd recovered are listed below:

- 102 Playas Plain Polished. Thin black, light weight, kaolinite tempered, 3-4 mm. thick, finely polished on one side, medium on other, gray to black. Biconical ollas with outflaring neck.
 - 57 Manteño Polished. Gray core, reduced firing; same as Playas but thicker. Ollas and compotes.
 - 56 Manteño Plain. Coarse, sandy ware, oxidized. Hardness 2.5.
 - 8 Manteño Burnished. Lost line on Playas Plain or Manteño Polished.
 - 4 Manteño Incised.
 - 56 Chanduy Polished. Polished on inside and rough on outside, fine sand and grit tempered, reduced firing, 5 mm. thick.
 - 1 Chanduy Red Banded. Fine tempered kaolinite ware.
 - 40 Cerro de Hojas graters. Finger-marked graters found in Manteño culture. Same paste as Chanduy Polished.
 - 5 (Similar to) Valdivia Brushed.
 - 1 Playas Engraved. On Playas Plain.
- (See Estrada, 1957 c.)

REFERENCES

- BUSHNELL, G. H. S.
1951. The archaeology of the Santa Elena Peninsula in South-West Ecuador. University Press, Cambridge.
- DORSEY, GEORGE A.
1901. Archaeological investigations on the Island of La Plata, Ecuador. Field Columbian Museum, Anthropol. Ser., vol. 2, No. 5, pp. 244-280.
- ESTRADA, EMILIO.
1954. Ensayo preliminar sobre la arqueología del Milagro. Editorial Cervantes, Guayaquil.
1956. Valdivia, un sitio arqueológico formativo en la costa de la provincia del Guayas, Ecuador. Mus. Victor Emilio Estrada. Pub. No. 1. Guayaquil.
1957 a. Últimas civilizaciones Pre-históricas de la cuenca del Río Guayas. Mus. Victor Emilio Estrada. Pub. No. 2. Guayaquil.
1957 b. Los Huancavilcas. Últimas civilizaciones Pre-históricas de la costa del Guayas. Mus. Victor Emilio Estrada. Pub. No. 3. Guayaquil.

1957 c. Prehistoria de Manabí. Mus. Victor Emilio Estrada. Pub. No. 4. Guayaquil.

1958 Las culturas Pre-Clásicas, formativas o arcaicas del Ecuador. Mus. Victor Emilio Estrada. Pub. No. 5. Guayaquil.

EVANS, CLIFFORD, and MEGGERS, BETTY.

1957. Formative Period Cultures in the Guayas Basin, Coastal Ecuador. Amer. Antiq., vol. 22, No. 3, pp. 235-247.

HUERTA RENDON, F.

1940. Una civilización Precolombian en Bahía de Caráquez. Rev. Colegio Nac. Vicente Rocafuerte, No. 51. Guayaquil.

JIJON Y CAAMAÑO, JACINTO.

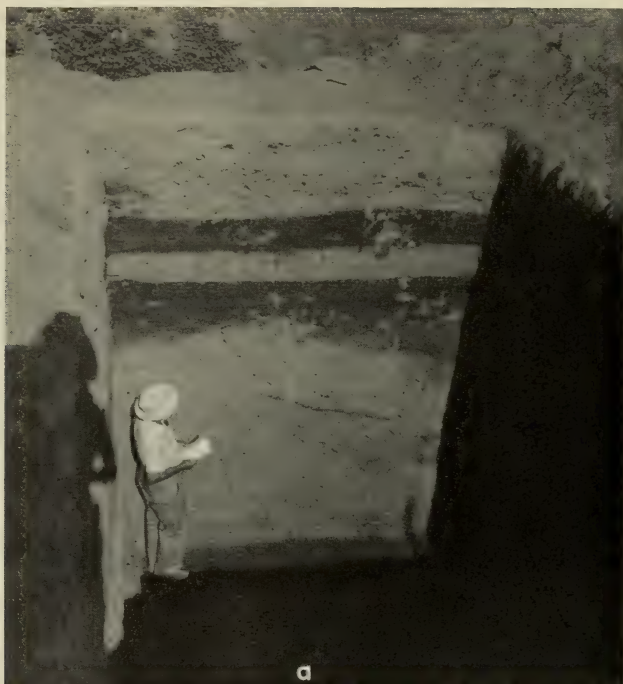
1951. Antropología Prehispanica del Ecuador. Quito.

SAVILLE, MARSHALL.

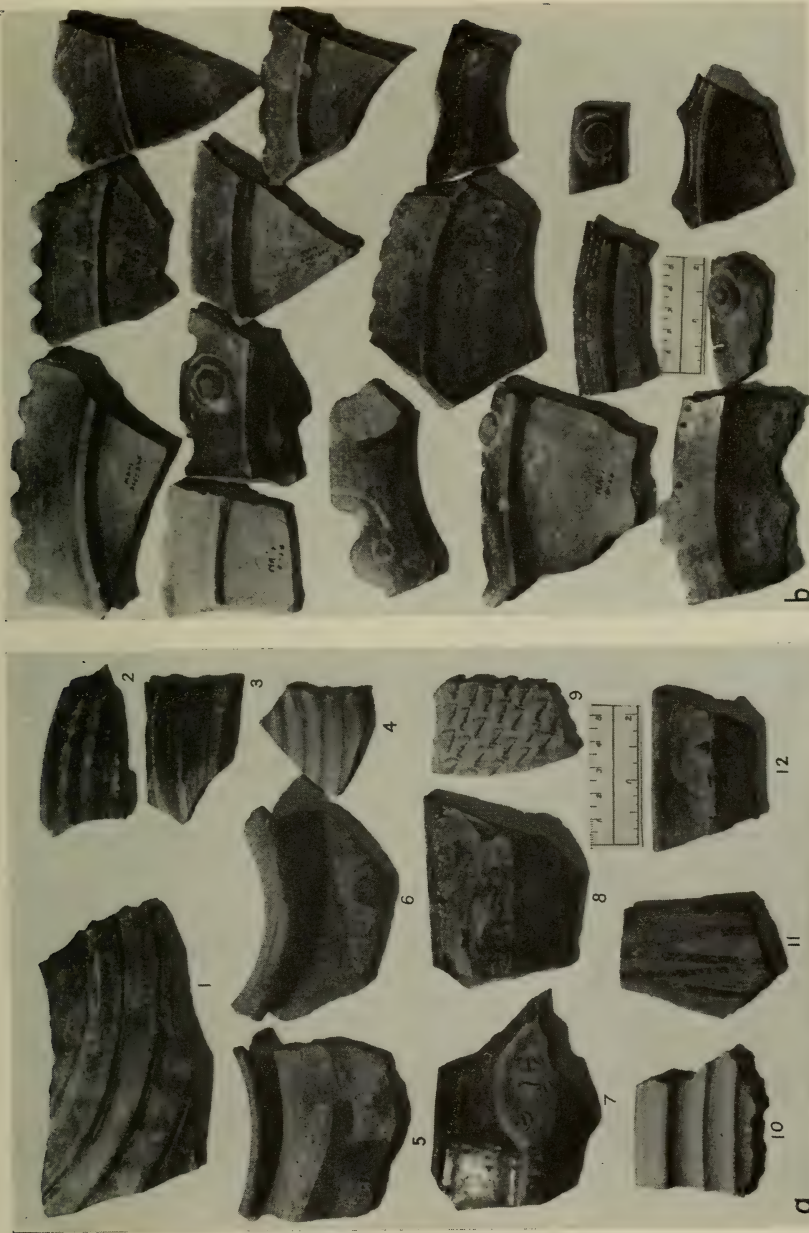
1907-10. The antiquities of Manabí, Ecuador. Contrib. Heye Mus., vols. 1 and 2. New York.



a, View from Estero site looking west toward Manta. *b*, Beginning of the stratigraphic trench at the Tarqui site.



a, The west end of the stratigraphic trench showing the caliche layer with moist sand above and below it, and sloping layering of the deposit. *b*, Test trench on Cerro de Hojas.



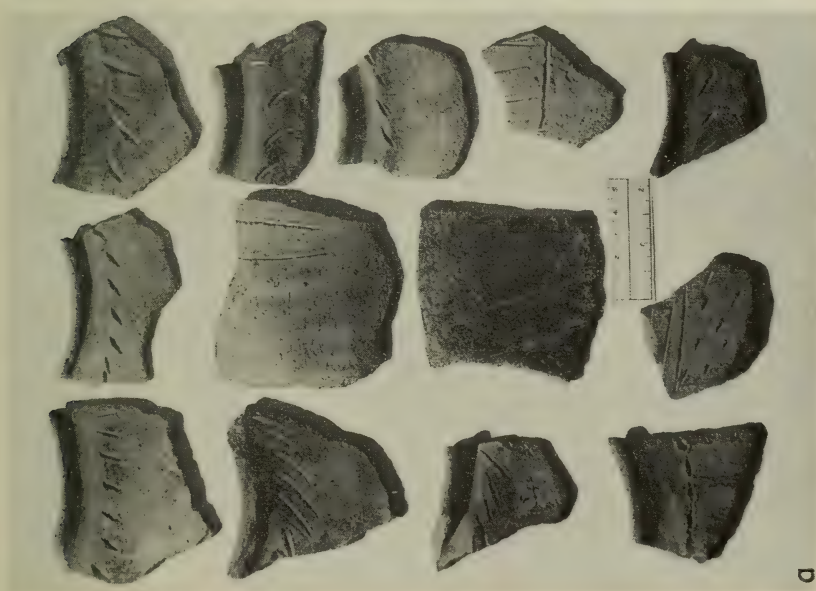
a, 1, 2, 3, 4, Horizontal gadrooned ware; 5, 6, red on white; 7, 8, 12, faces modeled on shoulders; 9, pseudocoiled; 10, finger-grooved grater sherd; 11, zoned red on buff. b, Modeled rim modifications.



a, Engraved red ware. *b*, Engraved gray or black ware. The two lower right-hand pieces have polychrome pigmentation in the lines.

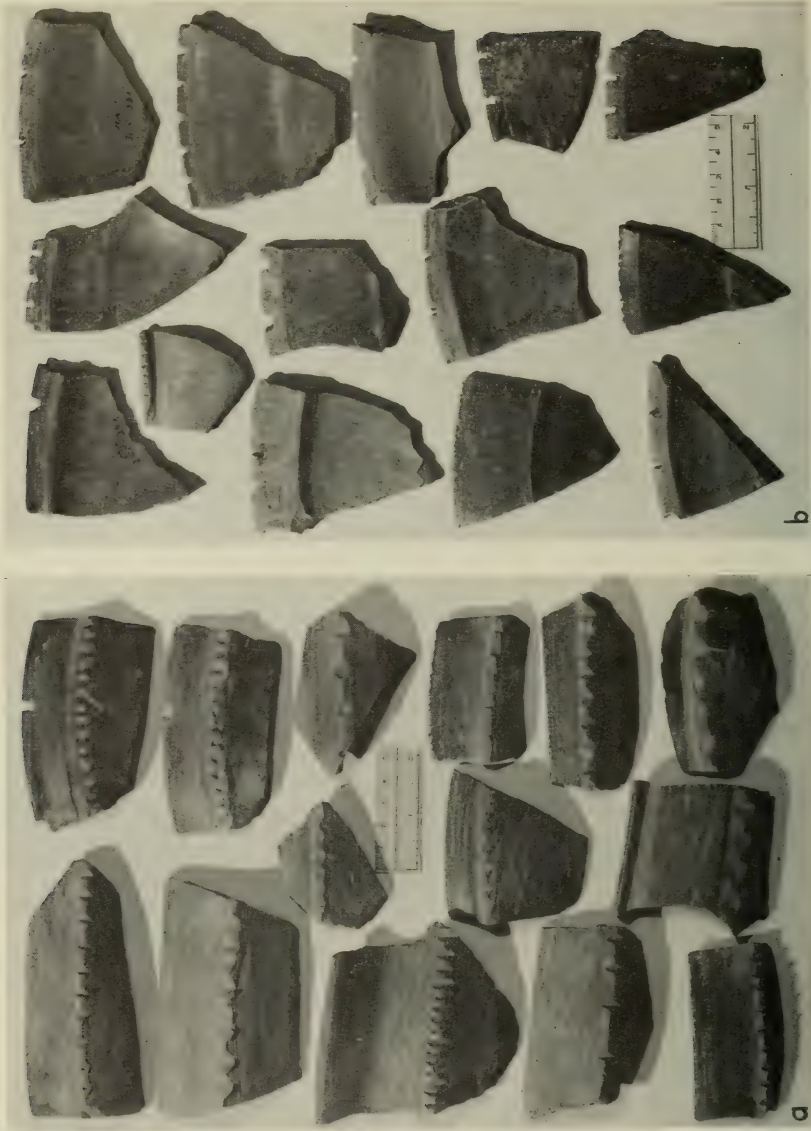


b



a

a, Incised coarse plain ware. *b*, Incised red on buff pedestal bases.



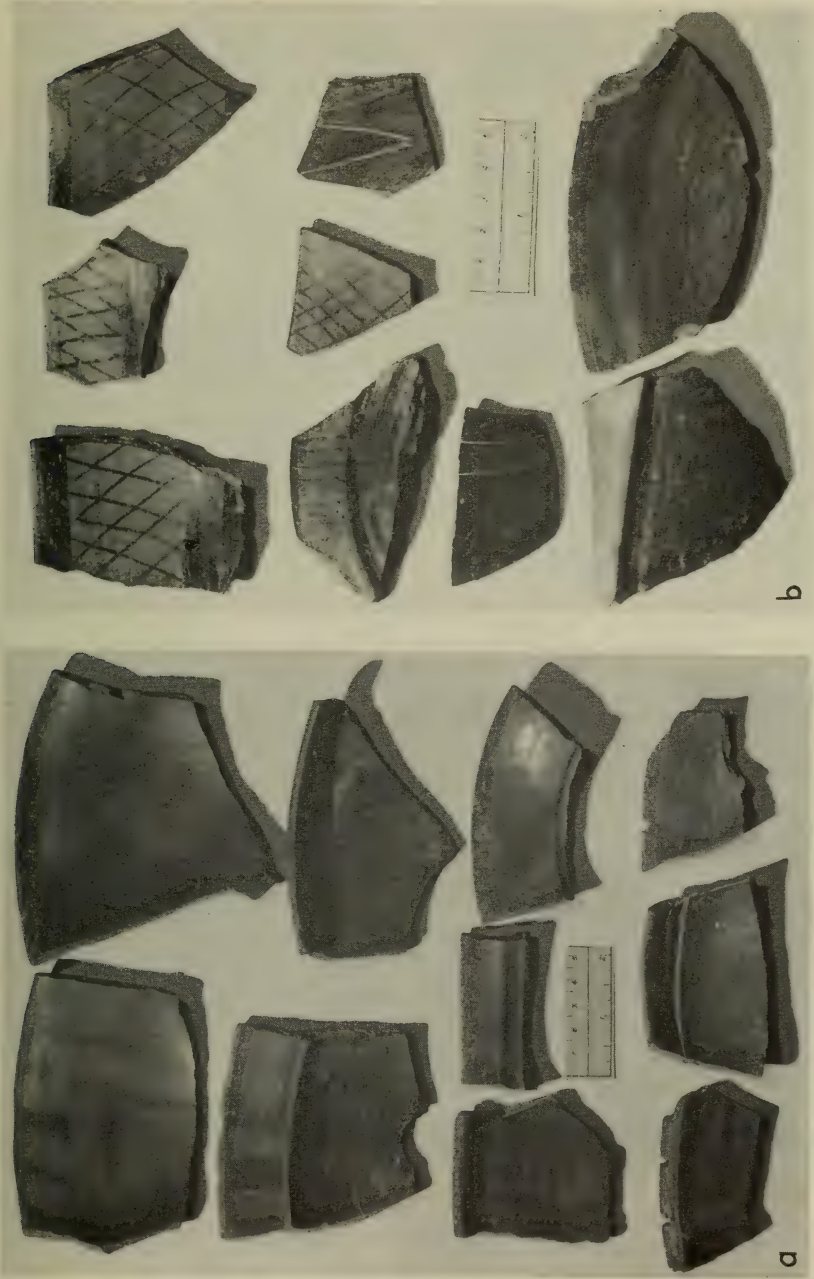
a, Notched shoulders and flanges. *b*, Notched rims.



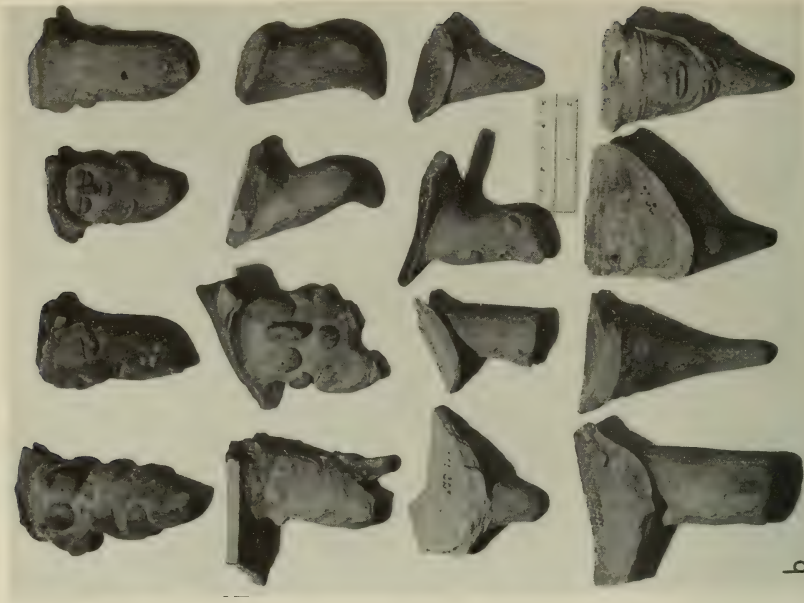
a, Perforated and deeply indented rims. *b*, Striated, or pebble polished ware.



a, Red on buff designs. b, Polychrome designs.



a, Luster painting. *b*, Dull black on polished black.



a, Types of polypod supports. *b*, Polypod supports.



b



a

a, Pottery "cradles," and fragments of monumental figurines. b, Stemmed cups, obsidian flakes, stone borers, and whetstone.



b



a

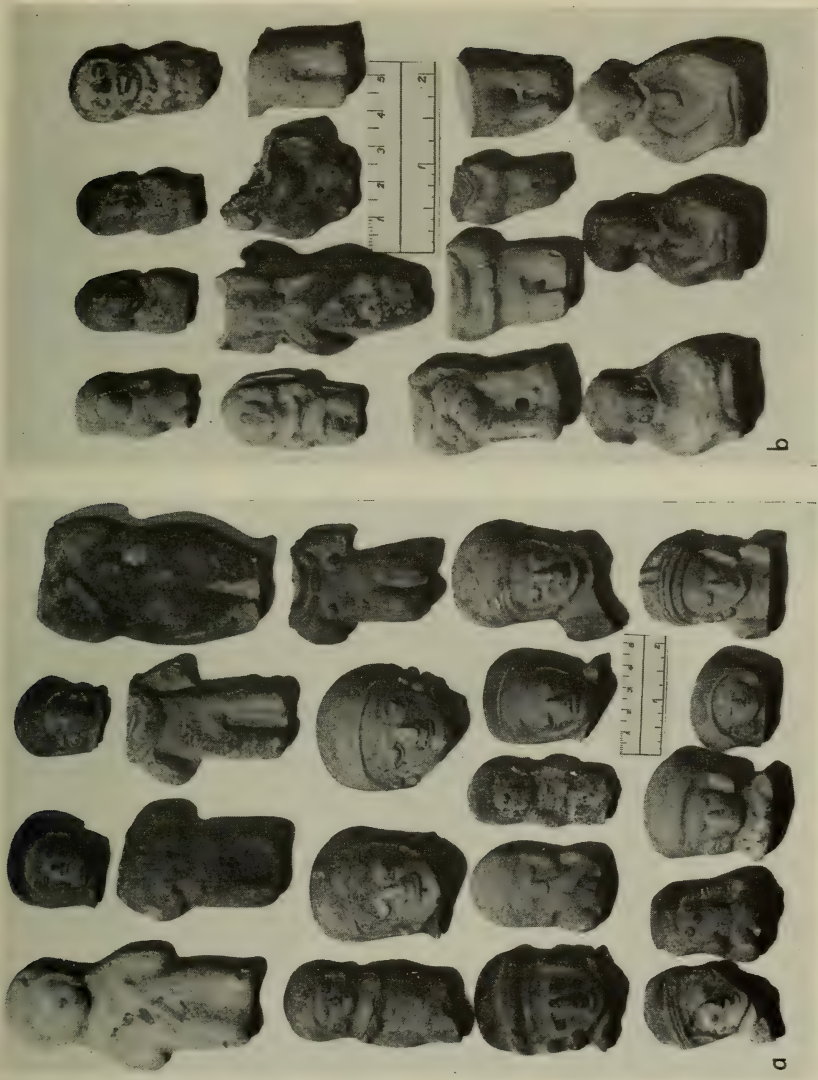
a, Type A figurines. b, Profiles of figurines in a.



a, Type A figurines with some variant forms. b, Torso of type A figurines.



a, Type B figurines. *b*, Profiles of figurines in *a*.



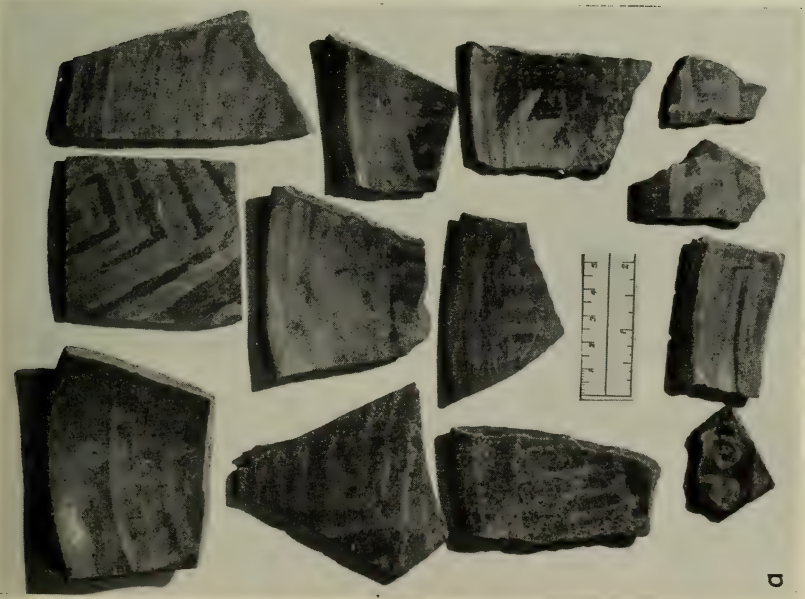
a, Type C figurines. *b*, Miniature type C figurines; most perforated for suspension.



a, Type D figurines. *b*, Type E figurines.

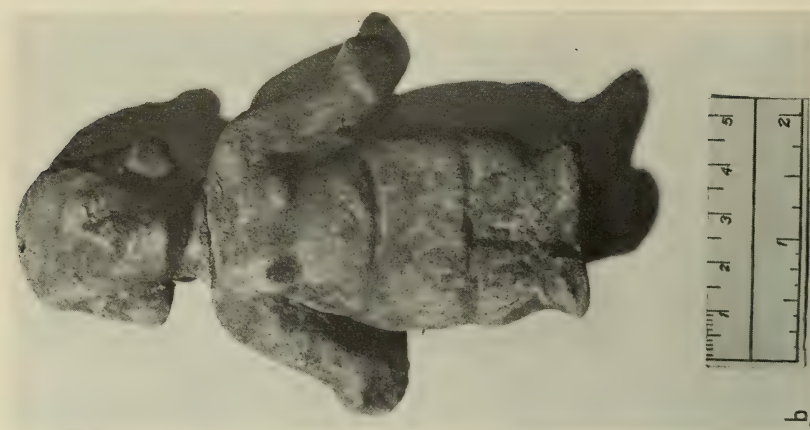
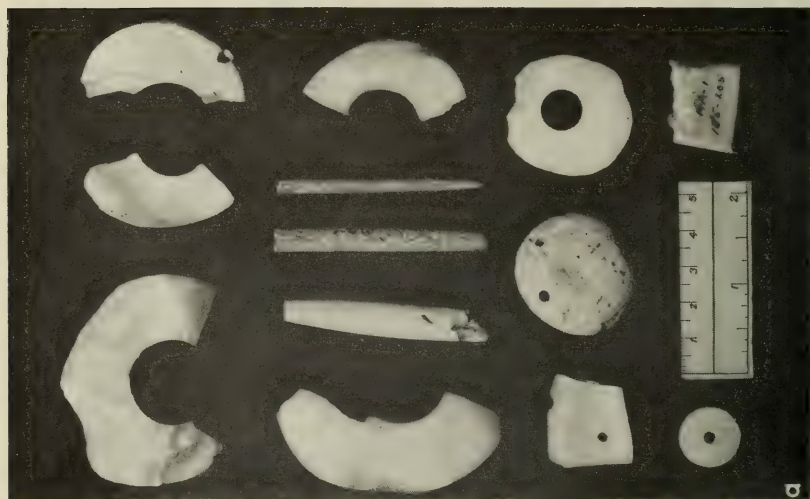


b

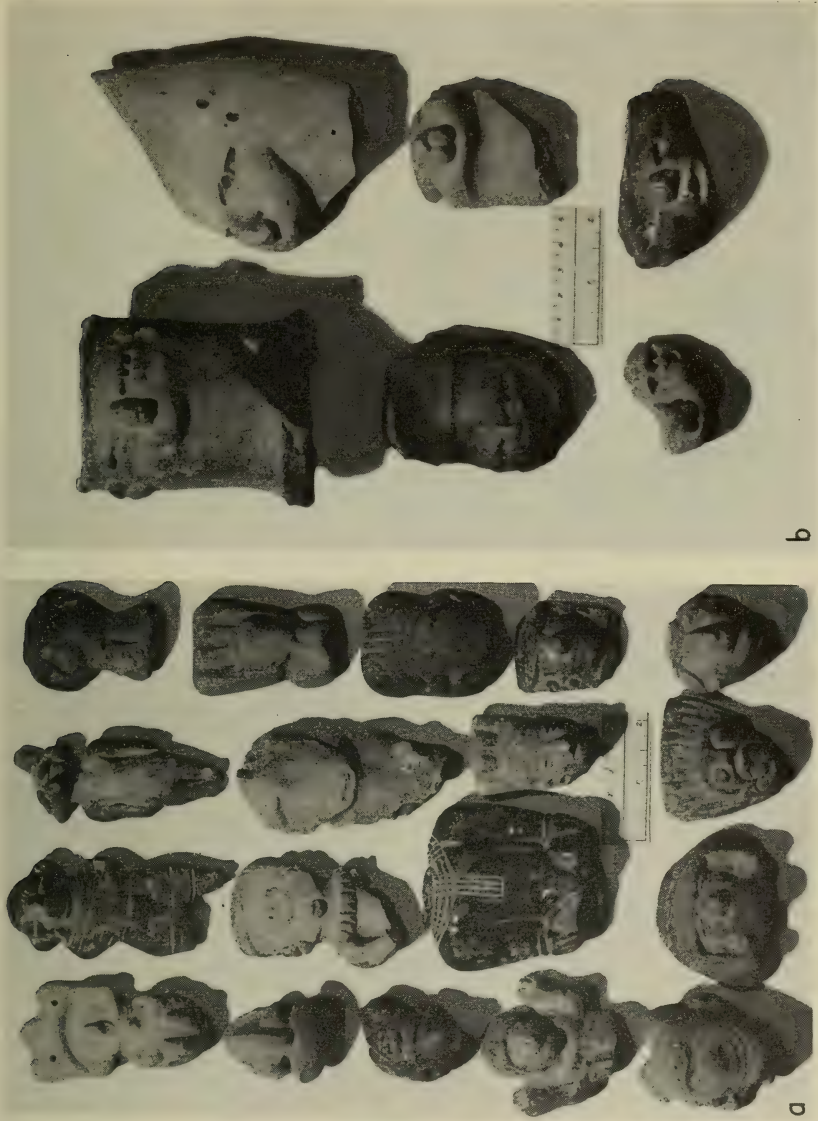


a

a, Negative painting, *b*, Animal figurines.



a, Objects of shell and bone. *b*, Figurine from the tube burial at La Tolita, which yielded charcoal giving a radiocarbon date of 1690 ± 200 (A.D. 267 ± 200).



a, Miscellaneous purchase figurines from the vicinity of Manta. b, Punctate-eye figurines from vessel necks, Estero site.

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BLACKFOOT INDIAN PIPES AND PIPEMAKING

By JOHN C. EWERS

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21. Three Piegan modified Micmac pipe bowls. *a*, Pipe bowl of Running Crane, Piegan chief, 1891. (After a drawing by C. H. Stephens.) (Courtesy University of Pennsylvania Museum.) *b*, Pipe bowl of Three Suns, Piegan chief, ante 1896. (Courtesy Museum of the Plains Indian.) *c*, Pipe bowl made by Reuben Black Boy in 1940's.
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BLACKFOOT INDIAN PIPES AND PIPEMAKING

BY JOHN C. EWERS

INTRODUCTION

The smoking of tobacco pipes played roles of importance in the religious, political, and social life of the historic Blackfoot Indians. Pipe smoking was an integral part of the involved ritual of opening sacred ceremonial bundles. It was an invariable part of the act of making peace with enemy tribes. In the early years of the fur trade Blackfoot chiefs smoked with white traders when they visited their posts before the exchange of goods began. An Indian whose word was doubted might solemnly swear by the pipe that his testimony was true. It was a common custom for a man seeking a favor of another Indian of his tribe to present him with a pipe at the time of making his request. If the pipe was accepted, he knew that his request would be acted upon favorably; if it was refused, he knew that it was denied.

Blackfoot etiquette called for the tipi owner to offer a pipe to male visitors to his lodge. However, my older informants of the 1940's stated that in their youth there were marked individual differences in the interest men took in smoking for pleasure. Some men rarely smoked except during their participation in ceremonies. Others spent a great deal of their leisure time puffing on their pipes. Most boys started to smoke when they reached their middle teens and began to join war parties. No ceremony was involved in a boy's taking his first smoke. He merely followed the actions he had so often seen his elders perform.

Strong arguments were used to discourage young men from smoking too much, as are indicated by the following Blackfoot sayings:

A young man who smokes too much has no wind.

If you smoke too much it will hurt your eyes.

The man who likes to smoke too much is the man who will draw the enemy when he is on a war party. The enemy will smell the smoke and be attracted to his location. Wild game will smell the smoke and will avoid the place where he is.

Girls did not smoke. But young married women learned to smoke when they attended ceremonies with their husbands. Older women

usually were the only ones of their sex who smoked for pleasure.

All men and many older women owned pipes. The making of tobacco pipes generally was regarded as a man's craft, although there were a few women among the Blackfoot who were pipemakers. Even in buffalo days pipemaking was a specialized craft. The number of pipemakers in each of the three Blackfoot tribes was small. They supplied their own needs for pipes and made them for gifts to, or barter with, their fellow tribesmen and women. It was not uncommon for a pipemaker, in the youth of my informants, to receive a horse, several buffalo robes, or other articles of equivalent value in exchange for a well-made tobacco pipe bowl and stem. Some pipemakers fashioned pipes to order for their Indian customers.

In recent years cigarette smoking has largely replaced pipe smoking among the great majority of Blackfoot men and women. Nevertheless, some of the older people of a high degree of Indian blood still smoke stone pipes for pleasure. And, of course, the pipe remains the traditional smoking equipment in Blackfoot ceremonies.

Although the demand for pipes has decreased materially within the present century, there were still more than a dozen pipemakers living on the Blackfoot Reservation in Montana and the Blood Reserve in Alberta in the decade of the 1940's, several of whom still made pipes as gifts to other Indians or to Whites. Very few pipes were made for sale.

Time has dealt rather harshly with the traditional men's handicrafts of the Blackfoot. In the 1940's there probably were as many pipemakers among the Blackfoot as there were makers of feather bonnets, drums, or other men's handicrafts. However, all the known pipemakers were elderly or middle-aged Indians, and unless some of the younger people take an active interest in pipemaking, this age-old craft will disappear from the Blackfoot Indians.

PIPE BOWL TYPES

THE STRAIGHT PIPE

When Clark Wissler investigated Blackfoot material culture in the field during the first decade of the present century, he found that "some old people stated that according to tradition, stone pipe bowls were not made before the introduction of iron tools. Blocks of hard tough clay were cut into the form of a pipe bowl, rubbed with grease, and hardened over the fire and by use." Wissler was dubious of this explanation. "This is an agreement with the traditions concerning pottery but seems unlikely" (Wissler, 1910, p. 83).

Nevertheless, Weasel Tail, an aged Blood Indian who was one of my best informants in the 1940's, recalled a tradition that his people had at one time made pipe bowls of clay. He understood that wet clay was moulded around an elkhorn to give it the proper shape. After the clay dried the horn was slipped out, leaving a tubular, clay pipe.

However, Weasel Tail agreed with other elderly informants that the most common tobacco pipe bowl among the Blackfoot Indians in the earliest times of which they had heard was a tubular one of stone, which they all referred to as a "straight pipe." Both Weasel Tail and Green-Grass-Bull thought that straight pipes were made before the Blackfoot obtained iron tools from the Whites, and that the holes were drilled with flint tools, probably working from both ends toward the center, while the outer surfaces were finished by rubbing with "sand rock."

Robert N. Wilson, who lived among the Blood Indians for more than 60 years as a Mounted Policeman, Indian Agent, and trader, possessed a collection of Blood Indian artifacts which included a straight pipe. Some of the elders of the Blood tribe considered that pipe to be the oldest known specimen of Blood Indian craftsmanship. Pete Bruised Head described this pipe to me as about 6 inches long and of a dark-colored stone. Unfortunately, this relic was stolen from Mr. Wilson's home at Standoff, Alberta, very shortly after his death. Its present location is unknown to me.

Wissler published a native drawing of a straight pipe which was in the sacred beaver bundle owned by Tom Kiyo, a Piegan, in the early years of this century. The drawing depicts a pipe of a slightly bulbous shape, the sides tapering from the center toward each end. Wissler regarded the beaver bundle as the oldest of the several classes of Blackfoot ceremonial bundles, and he considered Tom Kiyo's beaver bundle to be one of the oldest of this class (Wissler, 1912, pp. 170-171, fig. 25). However, the Blackfoot straight pipe also was the ceremonial property of the owners of the black and yellow buffalo tipis. Wissler was told that the "straight-bowled pipe" was given to the beaver bundle owners by the owners of the buffalo-painted lodges (*ibid.*, p. 232).

It may be significant that in Blackfoot mythology both the beaver bundle and the buffalo-painted lodges were represented as gifts to the Indians from underwater spirits. Short Face, who was reputed to have been the most able reciter of Blackfoot myths among the Indians living on the Blackfeet Reservation in the 1940's, told me the following story of the use of the straight pipe by the first owner of one of the two buffalo-painted lodges:

Both of the men who received the first buffalo-painted lodges were given straight pipes by the water spirit. Once when the Indians came to the river from which these painted lodges were obtained the water was so high that they could find no place to cross. Then Weasel Heart, who had been given one of the buffalo lodges, took his straight pipe, filled it with tobacco, prayed to the water spirit, lit the pipe, and walked into the water. As he walked he puffed upon his pipe, sang, and prayed. He walked all the way across the stream in water only knee deep. To the people on shore, the water appeared to be holding him up. Weasel Heart had placed a stick upright in the bank to mark the spot where he had entered the water. When he reached the far shore he planted another stick to show the place he stepped ashore. Then he turned and called to the people, telling them to follow his path between the two sticks. They all crossed the stream, never getting in water above their knees.

Ever since that time there has been a rock shelf across that river at that point, by which the river can be forded easily.^[1]

Short Face went on to say:

Weasel Heart told the people they were forbidden to light the straight pipe with a fire stick. He showed them how to light it by dipping the bowl into the fire and catching a live coal in the end of it. But later on an Indian disobeyed Weasel Heart's instruction and used a burning stick to light a straight pipe. When Weasel Heart learned of that man's action, he told the people that the water spirit was displeased with them for abusing his gift to them. Therefore, the straight pipe would disappear among them.

Short Face added, "Now, as you know, these straight pipes have completely disappeared among the Blackfeet."

Green-Grass-Bull regarded the straight pipe as a very holy object, used in beaver bundle rituals but not in those of the medicine pipe bundle. He also said that it was the straight pipe upon which the Blackfoot Indians used to take their oaths when they "swore by the pipe" that their testimony was true or their lives would be forfeited.

Within the memories of my elderly informants, the straight pipe survived only in the form of ceremonial pipe bowls preserved in medicine bundles. It was smoked only at such times as those bundles were opened and ritually manipulated. Weasel Tail recalled having seen one of these ceremonial pipes which was of red stone, about 3 inches long, and tapered from the bowl end toward the stem end. A lump of mud or charcoal was placed in the tube to keep the tobacco from filtering through into the stem. Green-Grass-Bull said that he had repaired a straight pipe from a medicine bundle owned by Chief White Calf (the last of the Piegan head chiefs, who died in 1903). He recalled that this bowl was shaped like a man's phallus with a rather bulbous end.

¹ Wissler (1912, p. 232) cited a shorter version of this myth which identified the river as High River and the location of the ford as near the present Northern Blackfoot Reserve in Alberta, Canada.

Until the summer of 1951 I had not seen a Blackfoot straight pipe. Then, while examining the series of Blackfoot medicine bundles in the Madge Harden Walters collection at the Denver Art Museum, at the invitation of the late Frederic H. Douglas, I found the pipe bowl shown in plate 20, *a*, in one of the beaver bundles. This straight pipe is of gray stone 3 inches long, with a rectangular collar half an inch in width at the stem end. The bowl opening is three-fourths of an inch in diameter and the stem opening is seven-eighths of an inch in diameter. This specimen bears no evidence of file or of other tool marks.²

Since that date I have seen one other Blackfoot straight pipe. It is in a Catcher's Society pipe bundle, used as a war medicine, in the collections of the Museum of the American Indian, Heye Foundation, New York City. This bowl, depicted in plate 20, *b*, is of grainy red stone (not catlinite), of a more bulbous shape than is the Denver Art Museum specimen. It also has a long constricted neck at the stem end. This bowl measures $3\frac{1}{2}$ inches in length, and has a diameter of $1\frac{1}{16}$ inches at the bowl end, and of three-fourths of an inch at the stem end.³

COMPARATIVE DATA ON STRAIGHT PIPES

Although few tubular pipes have been found archeologically on the Northwestern Plains, William Mulloy, in a recent survey of the archeology of this region, has assigned the tubular pipe to the Late Prehistoric and Historic Periods (Mulloy, 1958, p. 152). A tubular pipe of "fine sedimentary material like pipestone, except for its gray color" was found at the Meriwether Canyon site on the Missouri about $4\frac{1}{2}$ miles below the upper end of the Gates of the Mountains. It resembles the straight pipe in the Blood Indian beaver bundle in the Denver Art Museum (pl. 20, *a*), except that the collar at the stem end is circular rather than four-sided (Forbis, 1950, p. 3, and fig. 123). Possibly this pipe was of Blackfoot origin, for Blackfoot war and hunting parties frequented the Gates of the Mountains region in the early 19th century.

Contemporary references testify to the survival of the tubular pipe among some of the neighboring tribes of the Blackfoot in the early part of the 19th century. Capt. Meriwether Lewis described the pipe smoked by the Shoshoni chief Ca-me-ah-wait in August, 1805:

... this pipe was made of a dense semitransparent green stone very highly polished about $2\frac{1}{2}$ inches long and of an oval figure, the bowl being in the same

² This is cat. No. Pi-B1-10-PD, Denver Art Museum.

³ This is cat. No. 12/512, Museum of the American Indian, Heye Foundation. The bundle in which it appears was collected by William Wildschut on the Blackfeet Reservation, Montana, in 1923.

direction with the stem. A small piece of burned clay is placed in the bottom of the bowl to separate the tobacco from the end of the stem and is of an originally rounded figure not fitting the tube perfectly close in order that the smoke may pass. [Lewis and Clark, 1904-05, vol. 11, pp. 341-342.]

Lewis' rough sketch of this pipe, reproduced here in fig. 6, *a*, shows it to have been of the tubular variety with a constricted stem end and a bulbous center and bowl end which compares very roughly with the Blackfoot "straight pipe" collected by Wildschut (pl. 20, *b*).



FIGURE 6.—*a*, Shoshoni straight pipe, 1805. (After Lewis and Clark.) *b*, Straight pipe of type smoked by warriors among the upper Missouri tribes, 1833. (After Carl Bodmer.)

In 1833, the German scientist Maximilian, Prince of Wied-Neuwied, observed that the tubular pipe was widely used by members of war parties among the Upper Missouri tribes.

The Indians on the Upper Missouri have another kind of tobacco pipe, the bowl of which is in the same line as the tube, and which they use only on their warlike expeditions. As the aperture of the pipe is more inclined downwards than usual, the fire can never be seen, so as to betray the smoker, who lies on the ground, and holds the pipe on one side [Wied-Neuwied, 1843, p. 196.]

A drawing of this type of pipe by the Swiss artist Carl Bodmer, who accompanied Prince Maximilian, is here reproduced as fig. 6, *b*. The sides are shown as straight lines, without any collar or constriction at the stem end. Perhaps Bodmer's drawing represents a Mandan pipe, for Maximilian noted that the Mandan war leader's pipe was "a plain, unornamented tube" (*ibid.* p. 388).

There are tubular pipe bowls in two Crow "pipe-holders'" (war leaders') medicine bundles in the collections of the Museum of the American Indian, Heye Foundation. One bowl is of red stone, 6½

inches long. It is straight sided for the greater part of its length, with a narrow, round collar at the stem end. The other is 3½ inches in length, and constricted toward the stem end, which is wrapped with sinew. A note in the bundle stated that this bowl had a "small stone plug" in it, but that primitive filter was not in this pipe bowl when I examined it. This bowl is of grayish stone that has been blackened on the surface (Wildschut, 1960, p. 122, and figs. 47-50). A third Crow tubular pipe in the same collections accompanied a wooden effigy which was used as a war medicine. It is of red stone, only 2 inches long (*ibid.*, p. 32 and fig. 16). This bowl with a constricted stem end resembles a Kutenai tubular pipe illustrated by Thain White. It is noteworthy that the modern Kutenai, western neighbors of the Blackfoot, regard the tubular pipe as the oldest form of pipe bowl among their people (White, 1955, p. 7, and fig. 1).

Farther afield, George Bird Grinnell found that the Cheyenne regarded the straight pipe as an early pipe bowl form among that tribe. It was commonly made of the shank bone of a deer or antelope, and thus must have resembled the bone "cloud blowers" of the Kiowa and Comanche illustrated by McGuire (1898, p. 384, figs 15, 16). However, Grinnell reported that among the Cheyenne

pipes of similar form were made of stone, but were not common, and as they grew rarer came to have a sacred character, and were smoked only at particular times. The pipe used at the Medicine Lodge is straight and of stone. [Grinnell, 1923, vol. 1, p. 208.]

Maximilian's general statement regarding the use of the tubular pipe by war parties among the Upper Missouri tribes, and the documentation of the Piegan specimen in the Museum of the American Indian, Heye Foundation collections (pl. 20, *b*) both suggest that the Blackfoot formerly carried straight pipes on war expeditions as well as employing them in medicine bundle rituals. However, Weasel Tail, a very active warrior in his youth (1870's), told me that at that time Blackfoot men carried small pipe bowls resembling the form of the woman's pipe (pl. 22, *b*) on their horse-raiding expeditions. He could not recall having seen a straight pipe smoked on a war party.

MODIFIED MICMAC PIPES

While he was among the Blackfoot tribes at Fort McKenzie on the Missouri River near the mouth of the Marias in the summer of 1833, Prince Maximilian observed: "The true Blackfoot pipes are made of talc . . . or of a blackish stone, which is found in the Rocky Mountains. Their shape is shown in the annexed wood cuts . . . It is often in the form of a ball, or a pear, and rests upon a cubical foot" (Wied-Neuwied, 1943, pp. 251-252).

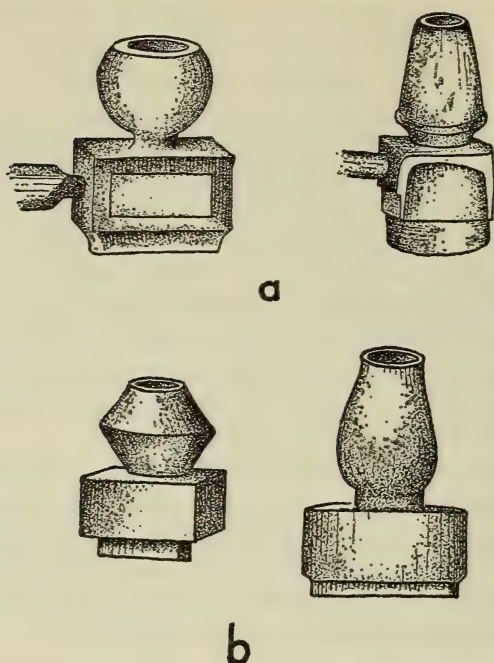


FIGURE 7.—*a*, Blackfoot modified Micmac pipe bowls, 1833. (After Carl Bodmer.)
b, Plains Cree (left) and Blackfoot (right) modified Micmac pipe bowls, period 1850.
 (After Henry Yule Hind.)

The wood cuts referred to are reproduced here as figure 7, *a*. I showed these illustrations to Weasel Tail, Blood Indian informant, in 1943. He said that he had seen Blackfoot pipes in the shape of the figure on the right, but could not recall ever having seen a pipe made by these Indians in the form of a low bowl on a heavy block such as appears in the drawing on the left.

In 1860, Henry Yule Hind, explorer of the Canadian Plains, pictured both a Plains Cree and a Blackfoot pipe bowl (Hind, 1860, vol. 2, p. 140). His line drawings are reproduced as figure 7, *b*, of this paper. Notice that the type Hind designated "Cree," resembles Maximilian's squat "Blackfoot" type which was unfamiliar to Weasel Tail, while Hind's tall-bowled Blackfoot pipe is like the one both Maximilian and Weasel Tail designated Blackfoot pipe bowls. While it is possible that the low-bowled type may have been a Blackfoot one that went out of fashion about mid-century, it appears more likely that this was not a Blackfoot but a Cree pipe form.⁴

⁴ Bodmer's original field sketch of a Blackfoot Indian smoking a pipe, which was displayed in the Smithsonian Traveling Exhibition Service's exhibition of Bodmer originals, certainly depicts a pipe bowl which is much like the one on the right in figure 7, *a* (Pope, 1954, No. 89).

Lieut. James Bradley described the Blackfoot pipe bowl of the early 1870's: "The bowl is varied in size from a hen's egg to that of a goose egg, a medium size being the most frequent. Its shape was similar to that of an egg, slightly elongated" (Bradley, 1923, pp. 263-264).

In his classic study of North American Indian pipes, Joseph McGuire included the Blackfoot pipe under the classification of "Micmac Pipes," which he described as follows:

It has a bowl, in shape not unlike an inverted acorn, which sits upon a keel-like base, broadest where it touches the bowl, and extending beyond the bowl at times an inch or more on each side. Through the top of this base or keel there is drilled a stem hole one-half its length until it intersects at right angles the base of the bowl. The tops of these terraced bases are seldom more than half an inch wide, though from front to back they are often 3 inches or more long, and from top to bottom they are as deep as they are long. The sides of the bases are parallel to each other, and are in two or three terraces, decreasing often until the lower part of the base is scarcely more than one-eighth of an inch thick. Through this base there are almost invariably one or more perforations. [McGuire, 1898, pp. 479-480.]

Because Blackfoot pipes lack "the perforation that the true Micmac has at the base of the bowl," G. A. West has preferred to term the Blackfoot pipe form "Modified Micmac" (West, 1934, vol. 1, p. 315).

Numerous examples of the Blackfoot Modified Micmac type of pipe bowl, collected during the Reservation Period (i.e. since 1876) are preserved in museum collections in this country and in Europe. A number of them have been illustrated in the literature.⁵

These specimens range in size from large ones more than 6 inches high, sometimes found in medicine pipe bundles, to little, women's pipes no more than $2\frac{1}{4}$ inches high.

Three well-documented Blackfoot bowls of the Modified Micmac type are illustrated in plate 21. Plate 21, *a*, is a reproduction of a sketch from the field notebook of the Philadelphia artist C. H. Stephens, who spent the summer of 1891 on the Blackfeet Reservation, Montana. It portrays a pipe owned by Running Crane, chief of the Lone Eaters Band of the Piegan. Because Running Crane was a noted pipemaker, it is likely that he made this bowl himself. Stephens' notes state that this bowl measured 4 inches high and $3\frac{1}{2}$ inches long, that the base was inlaid with a spot of lead, and the top of the bowl was bound with brass wire.⁶

Plate 21, *b*, is a photograph of a smoke-blackened pipe bowl of gray stone which is reputed to have belonged to Chief Three Suns

⁵ See Wissler (1910, fig. 48, p. 82; 1912, fig. 22, p. 140), both reprinted in Lowie (1954, pp. 27-28); West (1934, vol. 2, pl. 239).

⁶ I am indebted to the University of Pennsylvania Museum for permission to publish this sketch from the C. H. Stephens notebook in the collections of that museum.

(also known as Big Nose), prominent leader of the Grease Melters Band of the Piegan, who died in 1896. This bowl measures $3\frac{3}{4}$ inches in height. It is in the collections of the Museum of the Plains Indian, Browning, Mont.

The pipe bowl shown in plate 21, *c*, was made by my Piegan informant and interpreter, Reuben Black Boy, not long before he presented it to me in 1947. The bowl is of smoke-blackened gray stone from the Running Crane site on the Blackfeet Reservation. It measures 4 inches in height and 3 inches in length. This specimen illustrates the survival of the Modified Micmac type of pipe bowl among Blackfoot pipemakers for more than 110 years after this general form first was illustrated by Carl Bodmer in 1833. This type of bowl was known to my older informants by the name "real pipe." The term covered both the bowl pictured by Bodmer and the one made by Reuben Black Boy more than a century later.

THE DOUBLE PIPE

Some of my older informants spoke of a modification of the Modified Micmac pipe, which was made in the days of intertribal warfare, as the "double pipe." It consisted of two bowls, one behind the other, on a single base. It was made for a warrior who had met the enemy riding double on a single horse and had killed both of the riders. He alone was permitted to smoke it. Because counting coup under these unusual conditions was a rare accomplishment, few of these pipes were made by the Blackfoot. The only specimen I have seen is cat. No. I-29 in the collections of the Historical Society of Montana in Helena. This bowl, from the Ronan Collection, measures $2\frac{1}{2}$ inches in greatest height and $3\frac{1}{2}$ inches in greatest length. It is reproduced here as plate 22, *a*.

A double pipe in the style of a Siouan calumet was illustrated by George Catlin in 1841 (Catlin, 1841, vol. 1, pl. 64). This indicates that the double pipe was known to the Sioux in the 1830's. Whether it had the same symbolic significance as did the Blackfoot double pipe was not mentioned.

WOMEN'S PIPES

When Maximilian visited the tipi of the old Blackfoot chief Kutonapi near Fort McKenzie in the summer in 1833, he observed that "the old women smoked with us, but remained before the door of the tent" (Wied-Neuwied, 1843, p. 266). He neither described nor pictured the pipes smoked by these women. However, my elderly informants stated that in their youth older women commonly smoked small pipes with short, undecorated stems. I noticed that a number of

the older fullblood women still smoked pipes in the 1940's. The bowls were either small ones of the Modified Micmac type, or they were elbow pipes.

Wissler (1910, fig. 49, p. 83) illustrated a woman's pipe with its stem. The bowl is of the Modified Micmac type. A woman's pipe bowl of smoke-blackened, gray stone, collected by William Wildschut at Browning, Montana, in 1921, is portrayed in plate 22, *b*. This is cat. No. 12/563 in the collections of the Museum of the American Indian, Heye Foundation. It measures $2\frac{1}{2}$ inches high and $1\frac{3}{4}$ inches long at the base.

A photograph of a Piegan woman, Maggie Bull Plume, taken in the early 1920's, showing this Indian smoking an elbow pipe while carrying a baby on her back, appears as plate 23, *a*. In 1947 I took the photograph of Mrs. Cree Medicine, an elderly Piegan, smoking an elbow pipe she had made herself, which appears in plate 23, *b*.

THE SIOUAN CALUMET

The earliest published illustration of a Blackfoot Indian holding a pipe is Catlin's portrait of Buffalo-Back-Fat, Head Chief of the Blood Indians, whom the artist met at Fort Union in the summer of 1832. Catlin described this Indian's pipe bowl as

ingeniously carved by himself from a piece of red steatite of an interesting character, and which they tell me is procured somewhere between this place and the Falls of St. Anthony, on the headwaters of the Mississippi. (Catlin, 1841, vol. 1, p. 31, and pl. 7.)

Catlin doubtless referred to the famous quarry near present Pipestone, Minnesota, which he himself visited in 1836, and the stone from which was later named "catlinite" in his honor.

The bowl shown in this picture is a typical Siouan calumet, and, despite Catlin's statement to the contrary, it is doubtful if Buffalo-Back-Fat made it. In the summer of 1833, Prince Maximilian observed during his visit among the Blackfoot that the pipe bowls they "made themselves are not nearly so handsome as those of the Sioux, which they highly prize, and readily obtain by barter" (Wied-Neuwied, 1843, p. 251). My older informants of the 1940's knew of no Blackfoot pipemakers who had made bowls of catlinite. They confirmed Maximilian's statement to the effect that Siouan calumets were smoked by the Blackfoot, but said that they were obtained readymade from the Assiniboiné or Sioux farther down the Missouri. Furthermore, they said that these Siouan calumets were used for pleasure smoking but were never smoked in the religious ceremonies of the Blackfoot.

PIPESTONE QUARRIES

EARLY QUARRY SITES

Little information is available on the locations of the quarries from which Blackfoot Indian pipemakers obtained their stone during the early and middle years of the 19th century. Prince Maximilian, in 1833, learned only that "a blackish stone," from which the Blackfoot made pipes, was "found in the Rocky Mountains" (Wied-Neuwied, 1943, p. 251). Four decades later Lieutenant James H. Bradley stated that Blackfoot pipes were made "of a species of black marble obtained in the mountains, semi-transparent when the tobacco was ignited" (Bradley, 1923, p. 263-264). I have seen no Blackfoot pipes which could be described as semitransparent. Nevertheless, the fur trader William A. Ferris, who descended the Jefferson River in late September 1832, noted that

fifteen miles below Beaver Head is a quarry of green stone, that is semi-transparent, and easily cut with a knife. It is highly prized by the Indians for manufacturing into pipes. It is situated in a bluff, on the west side of the river; overlooking the plain. (Ferris, 1940, p. 171).

Ferris made no mention of the tribe or tribes which used this stone in pipemaking. However, since Blackfoot war and hunting parties visited the Jefferson River Valley in the 1830's and earlier, it is possible that they may have obtained pipestone from this quarry.

Elderly Piegan informants, questioned in the 1940's, understood that in the pre-reservation period their people obtained pipestone from quarry sites near the Rocky Mountains and south of the present Blackfeet Reservation, Montana. However, their statements were vague as to the precise locations of these quarries. Richard Sanderville understood that there was a quarry site near the Three Forks of the Missouri which the oldtimers found to be a source of good pipestone.

QUARRY SITES ON THE BLACKFEET RESERVATION

My informants told me of several pipestone sites on the present Blackfeet Reservation from which Piegan pipemakers had obtained their stone. All of these sites are located in the southern portion of the reservation. There were three relatively little-used quarries—one in the canyon of Birch Creek, which forms the southern boundary of the reservation; another at Duck Head Hill near the road from Heart Butte to Old Agency, and a third on the allotment of Louis Little Plume. The two most commonly used quarries are described below.

PIPESTONE CLIFF, TWO MEDICINE RIVER VALLEY

My elderly informants of the 1940's were unanimous in stating that the longest-used pipestone quarry within the reservation boundaries was the site they called Pipestone Cliff, located on the south side of the Two Medicine River about $1\frac{1}{2}$ miles below its junction with Badger Creek in the southeastern part of the reservation. They claimed that long before the Piegan settled on the Blackfeet Reservation in 1876, traveling hunting bands of this tribe, moving down the Marias from the Rockies, stopped by this cliff to quarry pipestone (pl. 24, *a*).

On October 6, 1942, I visited Pipestone Cliff with Reuben and Cecile Black Boy. The pipestone appears there in gray, horizontal strata some 2 or more feet in thickness. Climbing the talus slope they removed pipestone from the stratum located immediately above the top of this slope. With a crowbar Reuben pried loose some pieces of stone from the exposed surface, and then removed several, irregularly shaped pieces of unexposed pipestone (pl. 24, *b*). The unexposed stone was preferred because it was easier to work in pipemaking. Most of the stone removed at that time was used by Reuben for making pipes. However, I sent a sample of it to Dr. Eugene S. Perry, Department of Geology, Montana State School of Mines, Butte, Mont., who identified it as a calcareous shale. Dr. Perry further commented:

The quality making it desirable for pipestone is its uniformity in fine grained texture and mixing of mineral particles; but of course its ease in carving, and its ability to withstand heating without change in form (shrinkage, warping, cracking) are important.

Indeed, it was just these qualities of the stone, its fine grained texture, its ease of working with a knife and saw, and its resistance to cracking, that caused the stone from this quarry to be regarded by a number of modern Blackfoot pipemakers as the best pipestone available to them.

RUNNING CRANE QUARRY, BADGER CREEK VALLEY

Pipestone from a quarry site on the south side of Badger Creek on the Running Crane allotment, very near the site of the first Blackfeet Agency on Badger Creek, which was built in 1876, was second in popularity among modern Blackfoot pipemakers. My elderly informants said that stone from this quarry was not used by the Piegan for pipemaking prior to the establishment of that Agency. Running Crane, Chief of the Lone Eater's Band, may have been the first Piegan Indian to make pipes from this stone.

A sample of this pipestone was identified by E. P. Henderson, associate curator, Division of Mineralogy and Petrology, U.S. National

Museum, Smithsonian Institution, as "a sandstone containing some feldspar, and some quantity of calcium carbonate." Modern Indian pipemakers regard this stone as easier to work than the stone from Pipestone Cliff, but its rougher texture does not allow the smooth surface finish that can be given to pipes fashioned from the Pipestone Cliff material.

PIPESTONE FROM SOUTH MOCCASIN MOUNTAINS

In the early 1940's William Willcomb, a White friend of some of the Piegan pipemakers, brought them quantities of dickite, a variety of nonplastic Kaolin, from the south side of the south Moccasin Mountains about 15 miles west of the Judith Mountains in Montana. Although some pipemakers were willing to experiment with this easily worked material, the majority of them regarded dickite pipes as too fragile to be practical. To prove this point Reuben Black Boy took a pipe bowl he had made of stone from the Pipestone Cliff site, lifted it high above his head and threw it down upon the wooden floor of his home. The pipe bowl suffered no injury. He said that he would be afraid even to drop a dickite pipe bowl on the floor, lest it break into many pieces.

METHODS OF MAKING PIPE BOWLS

Field information was obtained regarding the methods employed by nine Blackfoot pipemakers (seven Piegan and two Blood Indians). Their work represented the crafts methods of three generations of pipemakers: (1) the generation that made pipes before the buffalo were gone and the Indians settled down to reservation life (ante 1876); (2) the generation that learned to make pipes in the early Reservation Period, during the last quarter of the 19th century; and (3) the generation that learned pipemaking within the present century. Descriptions of the methods used by each of these pipemakers follow:

GREEN-GRASS-BULL, PIEGAN

The dean of the Piegan pipemakers in the early 1940's was a quiet, little octogenarian named Green-Grass-Bull, who was born ca. 1861. He told me that he had learned how to make pipes by watching older men drill and shape them. As a boy he had seen his grandfather, Double-Comes-Over-the-Hill, make pipes. He also had watched Weasel Horn, Little Deer, and Crow-Gut-Man make them. His own father, Crow Top, was not a pipemaker. Green-Grass-Bull recalled that Crow-Gut-Man would repair a hole punched in the side of a pipe

by mistake by making his nose bleed in the hole and mixing the blood with dust from his pipemaking.

Green-Grass-Bull said that he was about 30 years of age when he made his first pipe bowl. He claimed that over a period of a half century he had fashioned more than 100 pipe bowls. Other informants, who had known Green-Grass-Bull since he was a young man, thought that this estimate was a very conservative one.

Green-Grass-Bull did not regard pipemaking as a particularly difficult craft "once you had made two or three of them." He continued to make pipes until he was about 82 years of age, stopping only when his eyesight became poor and his hands lost much of their strength and toughness. He generally made pipes from stone taken from below the surface of the quarry because it was softer and easier to work than the dry, brittle exposed stone.

In making a pipe bowl Green-Grass-Bull selected a nearly square piece of pipestone, and scratched the outline of the pipe he intended to make on one flat side of the stone with a nail. He first shaped the outside of the pipe with an old butcher knife and a file. Then he drilled the stem and bowl holes.

Green-Grass-Bull made his own drilling tools. He flattened one end of an iron rod (about three-eighths of an inch in diameter) by heating it in a fire, then pounding it with a hammer. While it was hot he bent the other end of the rod into the form of a ring. After the iron cooled, he sharpened the drilling end with a file. The drawing, figure 8, shows the form of this tool, which was about 7 inches long. Green-Grass-Bull said that he covered the ring end with a rag to prevent his hand from blistering as he rotated the drill by turning the ring handle. Because the pipestone quickly dulled the edge of his drill, he had to stop his drilling frequently to sharpen the expanded drilling end of his tool with a file.

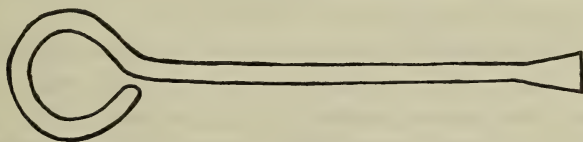


FIGURE 8.—Green-Grass-Bull's pipe-drilling tool.

In figure 9 the stem hole, which Green-Grass-Bull drilled first, is indicated by the letter A. The center portion of the bowl hole, which was drilled next, is B. The enlargement of the bowl hole, made with a broader-ended tool of the same general type, is C. D represents a round piece of charcoal which Green-Grass-Bull inserted at the junc-

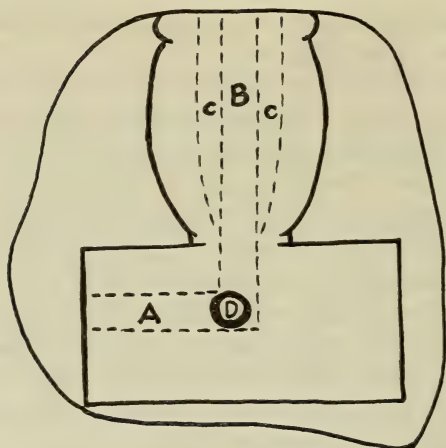


FIGURE 9.—Green-Grass-Bull's pipe-drilling procedures.

tion of the bowl and stem holes to prevent tobacco from filtering through to the stem.

After he drilled the holes, Green-Grass-Bull finished the pipe by more filing and finally by smoothing the surface with dried "jointed water grass" (*Equisetum arvense*, the common horsetail). He used this abrasive plant material by the handful. When one handful was worn out, he employed another, and then another until the entire surface of the stone pipe bowl was completely smooth.⁷

Green-Grass-Bull then proceeded to blacken the surface of his newly shaped pipe bowl. He dug a hole in the ground about 4 or 5 inches deep and 5 inches in diameter, then burned sage in it. He greased the surface of the pipe bowl with tallow, inserted a long stick in the stem hole, and held the bowl over the burning sage. He was careful not to let the stone become too hot or it might crack. After the surface of the stone became blackened, Green-Grass-Bull rubbed it with his hand until it "shined like a Crow's nose."

Green-Grass-Bull said that a new stone pipe should be broken in carefully. "Don't pull too hard on it, or it will crack. But after the stone gets hard you can smoke it as hard as you want."

In plate 25, *a*, Green-Grass-Bull is shown holding a shaped but yet unblackened pipe bowl of the typical Blackfoot Modified Micmac form. He did not make this pipe bowl, but he said that he usually made bowls of this form. Nevertheless, Green-Grass-Bull was es-

⁷ In August 1947, my Interpreter, Reuben Black Boy, and I made a test of this material. Reuben first filed a block of pipestone from the Running Crane quarry. Then we took turns rubbing the file marks with dried *Equisetum*. After an extended period of rubbing with quantities of this plant material the file marks completely disappeared. However, commercial sandpaper would have done the job in a much shorter time.

pecially proud of the fact he had once carved a bowl in the form of a bird's head which he had traded to a fellow Piegan, Brockey, for a steer. Green-Grass-Bull understood that Brockey later gave this bowl to George Bird Grinnell, a well-known student of Blackfoot Indian culture at the turn of the century.

RUNNING CRANE AND HIS CHILDREN, PIEGANS

The most prominent Piegan pipemaker of the last quarter of the 19th century was Running Crane, Chief of the Lone Eater's Band, who died July 14, 1902, aged about 76 years. A pipe bowl owned by him in 1891 is pictured in plate 21, *a*. Running Crane was said to have sold his pipes for as much as \$20 each and to have traded a pipe for "a good horse."

Running Crane's daughter, Deathly-Woman-Cree-Medicine (born ca. 1868), was the only woman living on the Blackfeet Reservation in the decade of the 1940's who had made pipes. She told me that she had learned the craft by watching her father and her mother, Crane-Old-Woman (who also was a pipemaker), at work. She followed their example in using stone from the Running Crane quarry site for her pipe bowls. She followed her father's example in employing a sharpened piece of hoop-iron to drill the bowl and stem holes, in shaping the exterior of the bowl with a file and removing the file marks with sandrock. Mrs. Cree Medicine preferred a sage fire for blackening the surface of a pipe bowl. She also greased the bowl before placing it over the smoke of the fire. She knew that other pipemakers used a buckbrush fire for blackening pipe bowls, but she thought buckbrush made too hot a fire and might crack the stone.

Plate 23, *b*, is a field photograph of Mrs. Cree Medicine smoking a small elbow pipe of her own making. She told me that she had also fashioned pipe bowls of the Modified Micmac form, and had carved an effigy pipe in the form of a man's head.

Wades-in-the-Water (born ca. 1871), a son of Running Crane, and himself for many years Chief of the Indian Police of the Blackfeet Reservation, told me that he also had made pipe bowls from stone quarried at the Running Crane site. He also preferred a sage fire for blackening pipe bowls. After the smoke-blackened bowl cooled, he polished the surface with a piece of buckskin or cloth.

MIKE DAY RIDER, PIEGAN

A fourth member of the oldest generation living on the Blackfeet Reservation in the 1940's who had made pipe bowls was Mike Day Rider (born ca. 1868). Mike told me that he blackened his pipe bowls

in the smoke of a sage fire, after he had rubbed the surfaces with grease.

REUBEN BLACK BOY, PIEGAN

My interpreter, Reuben Black Boy, was a skilled craftsman who claimed to have made more than 50 stone pipe bowls. Born in the year of the extermination of the buffalo in the Blackfoot country (1884), Reuben was of a younger generation than the pipemakers whose methods have been described above. Although his completed pipe bowls resembled those made by older craftsmen, he employed hand tools purchased from stores rather than improvised tools of his own making. Whereas the older craftsmen took several weeks to shape and drill a pipe bowl, Reuben, with his less primitive tools, could accomplish the task in little more than a day's time.

Reuben generally made his pipe bowls from stone quarried at the Pipestone Cliff site because he preferred its smooth texture to that of the more gritty pipestone from the Running Crane quarry. He first laid out the outline of the pipe bowl he intended to make on the flat side of a pipestone slab of the proper thickness. With a pencil he drew a rectangle, and within it sketched the outline of the shape of the bowl, and located the center lines of the bowl and stem holes (fig. 10, *a*). Then he placed the slab in a wood vise and cut the indicated rectangle from the irregularly shaped slab with a hacksaw. Next he placed a $\frac{1}{2}$ -inch steel drill in a carpenter's brace and drilled the bowl hole. Then, using the same tool, he drilled the stem hole to a point about one-fourth inch from its connection with the bowl hole. He then placed a $\frac{1}{4}$ -inch drill in the brace and completed the connection with the bowl hole (fig. 10, *b*).

With his hacksaw Reuben then roughed out the shape of the bowl as indicated in figure 10, *c*. Next he brought the outside of the bowl almost to its exact shape with a wood rasp. He then took his sharp pocket knife and finished shaping the outside and enlarged the inside to the form desired (fig. 10, *d*). Finally he smoothed the exterior surface with coarse, then fine, commercial sandpaper.

Reuben did not grease his pipe bowl before blackening it. He built a fire of green buckbrush (*Symphoricarpus occidentalis* Hook), and, placing a stick in the pipe stem hole, held the bowl over the fire for about 15 minutes until the bowl began to sweat. Then, after the stone had cooled, he rubbed the surface with his hand to give it an even, shiny surface.

GEORGE BULL CHILD, PIEGAN

George Bull Child, a contemporary of Reuben Black Boy, also employed carpenter's tools in pipemaking, although he said that it took

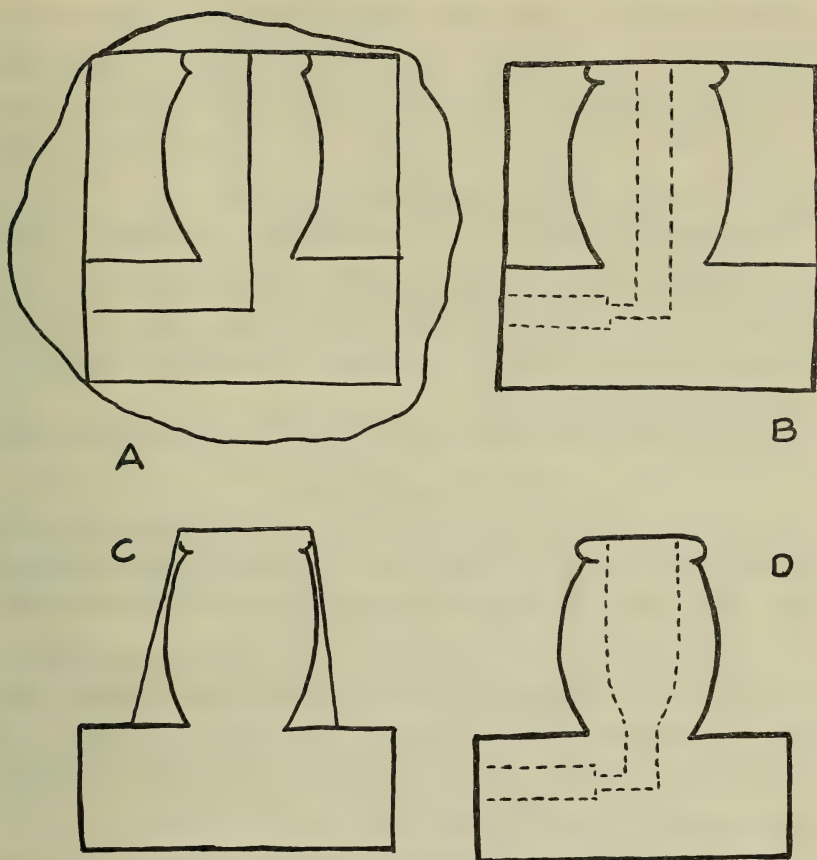


FIGURE 10.—Reuben Black Boy's pipemaking procedures.

him about a week to make a pipe bowl. He drilled the bowl and stem holes while the pipe was still in the block, then cut the outside close to its final shape with a hacksaw. He made his fire of either sage or buckbrush, greased the surface of the bowl, held the bowl in the smoke of the fire to blacken it, then polished the surface with a cloth.

SMALL-BACK-SIDES, BLOOD INDIAN

On the Blood Reservation in Alberta, in September 1947, Small-Back-Sides (also known as Not Good), a pipemaker reputed to have been 72 years old at the time, showed me the tools he used and described his method of making Modified Micmac pipe bowls. He said that he used a gray stone found at a quarry site on the north side of the St. Mary's River, about 10 miles above Lethbridge, and near the Black Horse Mine.

Small-Back-Sides' simple hand tools differed from those used by other pipemakers. He employed a hand drill, composed of a narrow V-shaped metal shaft, set in a wooden cross-handle. Holding this tool as illustrated in plate 26, *b*, he drilled the stem hole first, and then the bowl hole. He enlarged the latter with a flattened, sharp-sided screwdriver. He shaped the outside of the bowl with a rasp, then erased the tool marks with commercial sandpaper.

Small-Back-Sides said that he usually drilled and shaped his pipe bowls during the winter months. When cottonwoods were in bud the following spring he blackened the pipe bowls by rubbing the surfaces with sticky cottonwood buds, covering them with grease, and holding them over a fire of buckbrush. Finally he polished the blackened pipes with a cloth.

Plate 26, *a*, portrays Small-Back-Sides holding one of the pipes he had made.

IRON, BLOOD INDIAN

Although the Blood Indian, Iron, was reputed to have been 89 years of age in 1947, he told me that he had been making pipes for only 2 years. He used a black stone which he picked up here and there beside rivers and which did not require blackening.

Iron took the stone home and boiled it for a short time to soften it. He worked at his pipemaking for short, intermittent periods, sometimes laying the work aside for several days before returning to it. Before each work session he boiled the stone. He drilled the bowl and the stem hole before shaping the outside with a file. He removed the file marks with commercial sandpaper.

Iron's stone appeared to be inferior and his method of boiling it to soften it was unique among modern Blackfoot pipemakers. He acknowledged that if he boiled the stone too long it would crack. He also was afraid to exert much pressure in drilling the holes for fear of cracking the stone. His pipes were relatively small in size, as shown in the field photograph reproduced on plate 25, *b*, portraying Iron holding one of the pipes he had made. In form, it is of the familiar Modified Micmac type.

COMPARATIVE DATA ON SMOKE-BLACKENING OF PIPE BOWLS

It is remarkable that although eight of the nine Blackfoot pipemakers whose methods were made known to me intentionally blackened their stone pipes in the smoke of a fire after shaping them, only one brief reference to this practice appeared in the voluminous literature on the Blackfoot tribes published prior to 1940. Edward Curtis, in a brief description of North Piegan medicine pipes, stated: "The

material is stone, naturally white, but blackened in the smoke of buckbrush" (Curtis, 1907-1930, vol. 8, p. 185).

In the discussion of pipes in his generally excellent "Material Culture of the Blackfoot Indians," Clark Wissler appeared to miss this point entirely, writing:

The bowls were made of a dark greenish stone found in many parts of the Blackfoot habitat. . . . In course of time, the stone becomes hard and the heat from smoking turns the bowl a dull black. [Wissler, 1910, p. 83.]

In the early 1940's I began to survey the literature on North American Indian pipes and to consult ethnologists who had done fieldwork among other tribes to determine whether this method of coloring stone pipes was peculiar to the Blackfoot tribes, or whether it might not have had a much wider distribution. I soon found that the intentional smoke-blackening of stone pipes made from an original gray or relatively light-colored stone was practiced by a number of tribes over a broad geographical area extending from the Kutenai west of the Rocky Mountains to tribes living in the northern Woodlands quite to the Eastern Seaboard, and from the Plains Cree in Canada southward to the Brule Sioux on the Rosebud Reservation in South Dakota.

In 1934, David Mandelbaum learned that Plains Cree pipemakers, after shaping the bowl while the stone was kept wet, dried it in the sun. Then "the pipe was rubbed with fat throughout and gently heated over a fire. The melted fat was then greased once more and polished with buffalo hair" (Mandelbaum, 1940, p. 216).

The Assiniboin of Fort Peck Reservation made pipes of local gray stone in the form of the typical Siouan calumet. Henry Black Tail, an elderly Assiniboin of that reservation, told me in 1953 that the stone was worked while freshly quarried, the bowl and stem holes bored with an old knife "ground down slim," and the exterior shaped with a knife. Then tallow was rubbed over the surface and the pipe was placed over a buckbrush fire to make it jet black. Finally it was polished with buckskin. This description tallies with James L. Long's brief published account of Assiniboin pipemaking.

After a pipe was fashioned and finished, it was covered with tallow and passed back and forth, slowly through the flames. As the fat melted away more was added until the blackened grease penetrated the stonework. When it was entirely colored, the pipe was laid away to cool and later polished to a high gloss. [Long, 1942, p. 138.]

Farther down the Missouri the Mandan and Hidatsa Indians on Fort Berthold Reservation also made "blackstone" pipes, according to a letter received from Russell Reid of the State Historical Society of North Dakota in 1943. No description of their pipe-blackening

methods is in print. However, they are suggested by Frances Densmore's account of the stone head of a wand used by the Hidatsa Stone Hammer Society, one side of which was intentionally blackened. "A black glazed surface on the stone was secured by greasing the stone then wrapping it with grass which was burned off slowly" (Densmore, 1923, p. 115).

The Brule Sioux on Rosebud Reservation, South Dakota, made pipes of typical Siouan calumet form from a gray stone obtained from quarries on Black Pipe and Corn Creeks in the northwestern part of their reservation. These pipe bowls were greased, blackened over a fire of sage, then rubbed and polished. Some of these blackened pipes were grooved and inlaid with melted lead.⁸ A sample of the stone was identified by Dr. Eugene S. Perry as a shaly limestone.

Three men among the Chippewa on Turtle Mountain Reservation, North Dakota, stated that their pipemakers used a stone of grayish color which they blackened by rubbing with animal fat (formerly deer or buffalo) and placing the stone over a small fire of birchwood. The stone was turned to keep the heat uniform over the entire surface. After the stone cooled it was rubbed with the hand to give it a lustre. A number of these blackened pipes were carved in the forms of the heads of horses, buffalo, or deer.⁹

I have found positive evidence of the practice of blackening stone pipe bowls among only one tribe living west of the Rockies. In his study of Kutenai pipemaking Thain White stated:

Some of the pipes were placed immediately after manufacture in the dense smoke of a fire of red ozier (*Crokyus stalifler*) bark, which both hardened the stone and turned it glossy black. This appears to be the only known instance in which the Plateau Indians fired their stone pipes prior to use (White, 1955, p. 5).¹⁰

Far to the eastward of the Great Plains, Indians in the vicinity of the St. Lawrence River made smoke-blackened stone pipe bowls prior to 1750. Peter Kalm, an observant European traveler, visited the Falls of Montmorency, near Quebec, on September 7, 1749. He described the stone quarried there for use in pipemaking.

Pierre à Calumet. This is the French name of a stone disposed in strata between the lime schist and of which they make almost all the tobacco pipe heads in this country. The thickness of the strata varies. I have seen some pieces nearly fifteen inches thick, but they are commonly between four and five inches. When the stone is long exposed to the open air or heat of the

⁸ Letter from Flora D. Goforth, Arts and Crafts Specialist, U.S. Indian Service, Rapid City, S. Dak., April 4, 1943.

⁹ Letter from Leslie Keller, Principal of Education, Turtle Mountain Reservation, February 25, 1943.

¹⁰ White's account of Kutenai pipemaking also mentions the use of *Equisetum* for sanding the surface of a pipe bowl before blackening it.

sun it becomes a yellowish color, but on the inside it is gray. It is of such compactness that its particles are not distinguishable by the naked eye. It is pretty soft and will bear cutting with a knife. From this quality the people likewise judge the suitability of the stone for tobacco heads; for the hard pieces of it are not so fit for use as the softer ones. I have seen some of these stones split into thin leaves on the outside, where they are exposed to the sun. All the tobacco heads, which the common people in Canada use, are made of this stone, and ornamented in different ways. A great part of the gentry likewise use them, especially when they are on a journey.

The Indians have employed this stone for the same purpose for several ages past, and have taught it to the Europeans. The heads of the tobacco pipes are naturally of a pale gray color, but they are blackened while they are quite new to make them look better. People cover the head all over with grease and hold it over a burning candle or any other fire, by which means it gets a good black color, which is increased by frequent use. The tubes of the pipes are always made of wood and a brass wire holds them to the head. [Kalm, 1937, vol. 2, pp. 498-499.]

Kalm did not identify the Indians who had made pipe bowls of the stone from the Falls of Montmorency quarries long before they taught French colonists how to make them. The Laurentian Iroquois occupied the village of Stadacona on the present site of Quebec when visited by Jacques Cartier in 1535.

Frank G. Speck wrote to me in 1943 that he was positive that Penobscot and Malecite pipe bowls were greased and polished by hand or with a skin cloth. He did not know if they were intentionally smoke-blackened, and referred me to the specimens he had collected which were in the Museum of the American Indian, Heye Foundation. George G. Heye, director of that museum, informed me that the collections contained one Penobscot and three Passamaquoddy pipes of light-colored stone which appeared to have been intentionally smoke-blackened. One of these, which had been chipped, showing an exposed portion of gray stone, is illustrated in plate 27. It is cat. No. 18/7401. This bowl was obtained from the Passamaquoddy of Maine, and stands $3\frac{3}{8}$ inches high.

Field data seem to be lacking as to the employment of the smoke-blackening technique by pipemakers of the many Algonquian tribes situated between the St. Lawrence River and the Great Plains. Nevertheless, many black-surfaced pipe bowls from the Central Algonquian tribes are preserved in museum collections. In view of the known wide distribution of the smoke-blackening trait, it would appear most probable that those pipes from these tribes which are of an original gray or other light-colored stone with either a dull or a lustrous black surface finish were intentionally blackened over a fire as an integral step in their manufacture, and that they did not acquire this blackened exterior solely and gradually through use.

The comparative data presented above suggest that the smoke-blackening techniques in the coloring of tobacco pipes of stone had a continuous distribution from Maine to Western Montana. This distribution was wider than was the occurrence of any form of tobacco pipe. The technique was used in the finishing of Siouan calumets, Chippewa short-prowed pipes, elbow and effigy forms, as well as Micmac and Modified Micmac pipe bowls.

PIPESTEM MAKING

There was general agreement among my older Blackfoot informants regarding the method employed by their ancestors in making pipestems in the days before their people obtained metal tools. Green-Grass-Bull recalled that in his youth men on war parties made pipestems of sections of red willow or wild rosewood about 6 inches long. They split the wood lengthwise, gouged out the pith with a knife, fitted the two pieces together again, and bound them with sinew. He thought this was the way in which the Blackfoot made pipestems before they obtained iron.

Weasel Tail, who was of the same opinion, added that dried rather than green wood was used for these pipestems. It could be split without difficulty with a flint knife. After the pith was removed the halves of the pipestem were fastened together with a glue prepared from a boiled buffalo phallus (a substance which also was used for glue in arrow-making). The sinew wrappings were put on while wet so that they would tighten as they dried and bind the stem tightly.

Wissler illustrated a woman's pipe fitted with a stem of this kind. He also thought that this stem was suggestive of the way in which the Blackfoot made pipestems before the introduction of iron by White traders (Wissler, 1910, p. 83, fig. 49).

Prince Maximilian, in 1833, observed that the pipestems of the Blackfoot were "made of wood, broad, flat or round, and sometimes carved in imitation of a serpent" (Wied Neuwied, 1843, p. 252). Probably he referred to the long pipestem typical of the Blackfoot in more recent times and described by Lieut. Bradley in the 1870's as "usually made of an ash twig by removing the pith and was ordinarily about three feet long" (Bradley, 1923, p. 264).

Green-Grass-Bull claimed that "a long-stemmed pipe makes a good, cool smoke, and does not juice." He said that he and other Blackfoot pipemakers removed the pith from an ash stem by heating a long, iron rod about one-eighth inch in diameter or smaller and pointed at the end, and then passing it lengthwise through the stem.

Lazy Boy, my eldest Piegan informant (born ca. 1855), was not a pipemaker. But he described the making of pipestems as he had observed it in his youth:

The Piegan preferred ash wood for pipestems. It is hard and has a pretty grain. We got it from the Crow and Sioux country, but not necessarily in trade. If we couldn't get ash we used willow from this section—silver berry willow or service berry willow. But the grain of these was not as pretty as ash.

Ash of the straightest grain we could get was what we liked best. The wood was put in the sun to dry. Then, when half dry, it was heated over a fire and straightened until it was perfectly straight. The pipemaker then took a hot piece of wire about a yard long. He prayed that the wire would go straight through and not burn out at the side. He made three passes at the end of the stem. On the fourth pass he pushed the hot wire through the length of the stem. If the wire didn't go straight, but came out at the side, it meant bad luck for the pipemaker.

After the hole was made, the pipestem was smoothed on the outside with sandrock. The stem often was wrapped in three places—in the center, and near each end—with brass wire. But stems wound with wire were not used in ceremonies.¹¹

COMPARATIVE DATA ON PIPESTEM MAKING

The split, sinew-wrapped pipestem may have been an early Blackfoot type, but it certainly was not peculiar to those Indians. The Plains Cree made them of saskatoon berry shoots. "A suitable rod was split and longitudinal grooves cut down both halves. The two pieces were fitted together and bound with sinew. Aqueous matter from buffalo eyes was applied over the whole stem" (Mandelbaum, 1940, p. 216). Short pipestems were similarly made by the Eskimos of the Eastern Arctic (Manning, 1948, pp. 162–163).

Boring the stem hole in an ash pipestem by the hot wire method was a widespread custom among the Plains tribes. George Catlin seems to have been the first observer to mention it. Writing of the making of catlinite pipes, presumably by the Sioux, in the 1830's, Catlin stated:

The stems are uniformly made of the stalk of the young ash, which generally grows straight, and has a small pith through the center, which is easily burned out with a hot wire or a piece of hard wood, by a much slower process. [Catlin, 1841, vol. 1, p. 235.]

CONCLUSIONS

The straight pipe is the oldest form of tobacco pipe bowl known to Blackfoot traditions. Its relative antiquity is attested by the facts that the straight pipe is the only form referred to in tribal mythology,

¹¹ A man's pipe illustrated by Wissler has a stem wrapped with brass wire as described above (Wissler, 1910, p. 83, fig. 48).

that it could have been made with stone tools more easily than other known Blackfoot pipe bowl forms, and that it has survived only in the ceremonial contexts of sacred bundles. Probably the straight pipe bowl was smoked most commonly while fitted to a fairly short willow or rosewood stem, which was split longitudinally, the pith removed, and the two pieces glued together and tightly bound with sinew.

The two known examples of Blackfoot straight pipes differ markedly from each other in form. One has a rather bulbous bowl with a constricted neck at the stem end (pl. 20, *b*). The other has slightly curved sides with a collar at the stem end (pl. 20, *a*). Both forms were found among other tribes, the former among the Shoshoni as early as 1805 (as demonstrated by Lewis and Clark data), and the latter among the Crow Indians in the 19th century (as illustrated by specimens from pipe-holder's bundles). Data are insufficient to indicate that the Blackfoot favored either form of straight pipe, or to make possible the positive identification of straight pipes found archeologically as of Blackfoot origin.

The Modified Micmac pipe bowl appears to have been made by Blackfoot pipemakers only within the period that metal tools have been available to them. Its generalized resemblance to the pipe bowls made by Woodland tribes suggests its development from the Micmac pipe. It appears to me not only possible but probable that the Modified Micmac pipe bowl of the Blackfoot Indians originated in the early years of the extension of the fur trade up the Saskatchewan Valley from eastern Canada, and resulted from direct contacts with traders and Eastern Indians who smoked Micmac pipes. Some of the traders who operated in the Blackfoot country in the last quarter of the 18th century may have smoked Micmac pipes. During the last decade of that century Nepissing, Algonquian, and Iroquois Indians, more than 250 in number, followed the fur traders' canoes to the Blackfoot post of Fort Augustus, near present Edmonton, Alberta (Thompson, 1916, p. 312). The Blackfoot Modified Micmac pipe bowl may have been a modification of the Micmac pipes smoked by those Indians.

It seems unlikely that the Blackfoot made pipes of this type more than 40 or 50 years before Prince Maximilian first described and pictured the Blackfoot Modified Micmac pipe bowl in 1833 (fig. 7, *a*). It has remained the principal form of Blackfoot tobacco pipe to the present time.

Blackfoot Modified Micmac pipe bowls generally were made from grayish or greenish stone quarried in river-valley sites found in or near the Blackfoot country. Each pipemaker probably devised and

made his own drills from hoop iron or iron rods traded to the Indians by Whites. The tools employed by Blackfoot pipemakers in the early years of the 19th century may have differed little from those used by the oldest generation of pipemakers still living in the 1940's. These simple hand drills were fashioned by the pipemaker himself, by heating, pounding, and sharpening pieces of trade iron. Trade knives and files were used in shaping the exteriors of pipe bowls. Tool marks were removed from the outer surfaces with abrasive *Equisetum* or sandstone. The continued use of a charcoal, clay or stone filter in the bowl may have been a survival from the primitive period of straight pipemaking. Whether the technique of smoke-blackening the surface of a pipe bowl was introduced from the east along with the Micmac pipe bowl pattern is more questionable. However, the early known occurrence of this technique on the St. Lawrence, and its demonstrated wide distribution among tribes to the eastward of the Blackfoot, suggest that this technique was not a Blackfoot invention. Nor is it likely that Blackfoot pipemakers invented the drilling of long ash pipestems with heated iron rods.

Blackfoot pipemakers could achieve much the same results by employing different tools and methods of work. The major 20th century improvements appear to have been the adoption of common white men's carpenter's tools—the brace and drill, hacksaw, wood rasp, and commercial sandpaper. These new tools enabled Indian pipemakers to accomplish their tasks more rapidly. Nevertheless, pipemaking has remained a handicraft. None of the Blackfoot pipemakers of the 1940's employed any power tools.

REFERENCES

BRADLEY, JAMES H.

1923. Characteristics, habits and customs of the Blackfeet Indians. *Montana Hist. Soc. Contrib.*, vol. 9.

CATLIN, GEORGE.

1841. Letters and notes on the manners, customs, and condition of the North American Indians. 2 vols. London.

CURTIS, EDWARD S.

1907-30. *The North American Indians*. 20 vols. Norwood, Mass.

DENSMORE, FRANCES.

1923. Mandan and Hidatsa music. *Bur. Amer. Ethnol. Bull.* 80.

FERRIS, W. A.

1940. *Life in the Rocky Mountains*. Ed. by Paul C. Phillips. Denver.

FORBIS, RICHARD G.

1950. Archaeological data from the Gates of the Mountains. *Montana State Univ. Anthrop. and Soc. Pap.* No. 1.

GRINNELL, GEORGE BIRD.

1923. *The Cheyenne Indians, their history and ways of life*. 2 vols. Yale Univ., New Haven.

HIND, HENRY YULE.

1860. Narrative of the Canadian Red River exploring expedition of 1857 and of the Assiniboine and Saskatchewan exploring expedition of 1858. 2 vols. London.

KALM, PETER.

1937. Peter Kalm's travels in North America. Ed. by Adolph B. Benson. New York.

LEWIS, MERIWETHER, and CLARK, WILLIAM.

- 1904-05. Original journals of the Lewis and Clark Expedition. Ed. by Reuben Gold Thwaites. 8 vols. New York.

LONG, JAMES L.

1942. Land of Nakoda; the story of the Assiniboine Indians. U.S. Montana Writers Project. Helena, Mont.

LOWIE, ROBERT H.

1954. Indians of the Plains. American Museum of Natural History. Anthropol. Handbook No. 1.

MCGUIRE, JOSEPH D.

1898. Pipes and smoking customs of the American aborigines, based upon material in the U.S. National Museum. Ann. Rep. U.S. Nat. Mus., 1897.

MANDELBAUM, DAVID G.

1940. The Plains Cree. Amer. Mus. Nat. Hist. Anthropol. Pap., vol. 37, pt. 2.

MANNING, T. H.

1948. Pipestems of the Caribou Eskimos. Amer. Anthropol., n. s., vol. 50, No. 1, p. 162.

MULLOY, WILLIAM.

1958. A preliminary historical outline for the Northwestern Plains. Univ. Wyoming Publ., vol. 22, Nos. 1 and 2.

POPE, ANNEMARIE H.

1954. Carl Bodmer paints the Indian frontier. A traveling exhibition of watercolors and drawings circulated by the Smithsonian Institution.

THOMPSON, DAVID.

1916. David Thompson's narrative of his explorations in western America, 1784-1812. Ed. by J. B. Tyrrell. Champlain Soc. Publ. No. 12. Toronto.

WEST, GEORGE A.

1934. Tobacco pipes and smoking customs of the American Indians. Milwaukee Public Museum Bull., vol. 17.

WHITE, THAIN.

1955. Kutenai pipes. Western States Branch, Amer. Anthropol. Assoc. Western Anthropol. No. 1.

WIED-NEUWIED, MAXIMILIAN ALEXANDER PHILIP, PRINZ VON.

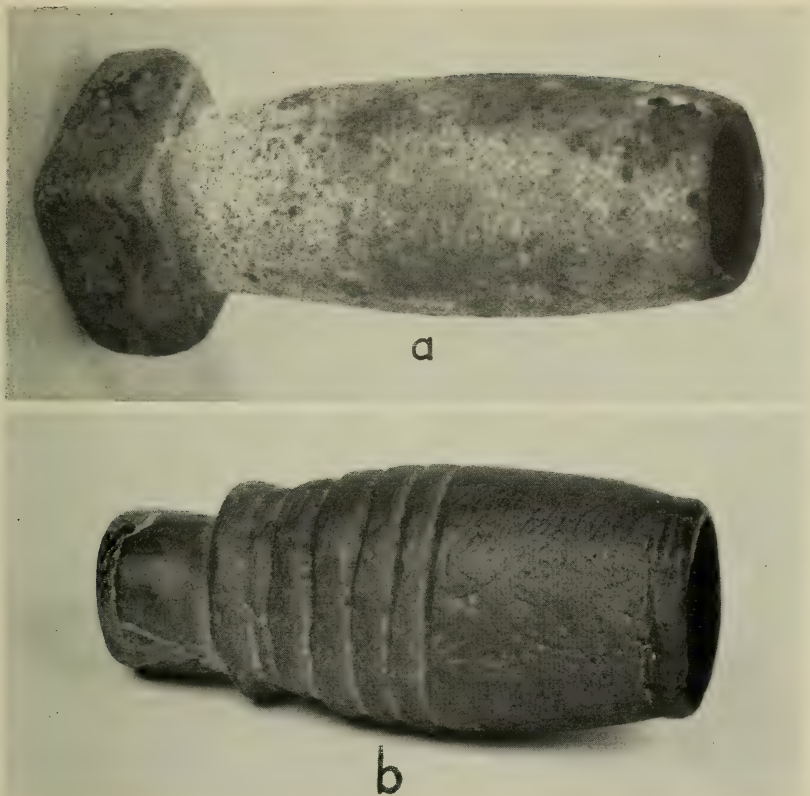
1843. Travels in the interior of North America. London.

WILDSCHUT, WILLIAM.

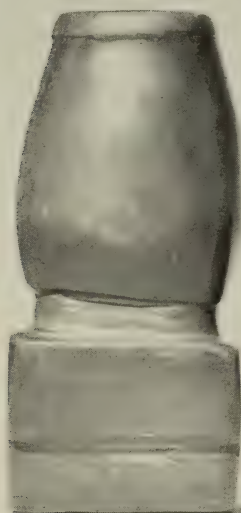
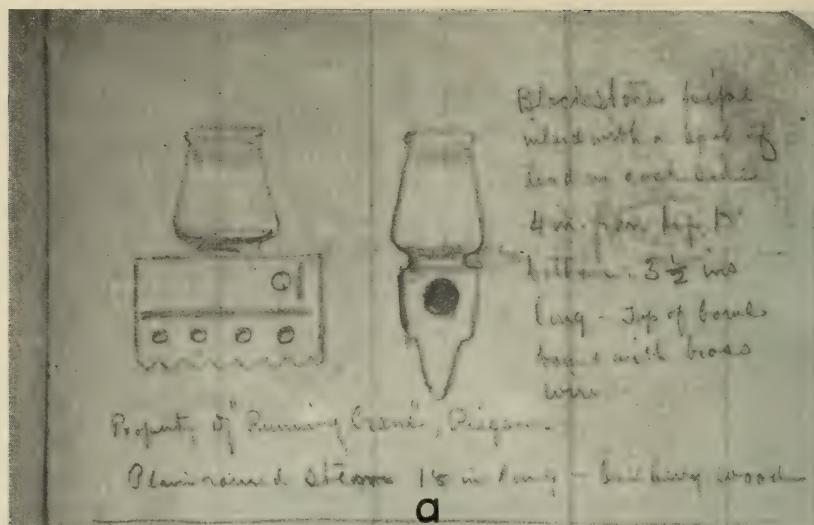
1960. Crow Indian medicine bundles. Ed. by John C. Ewers. Contrib. Mus. Amer. Indian, Heye Found., vol. 17.

WISSELER, CLARK.

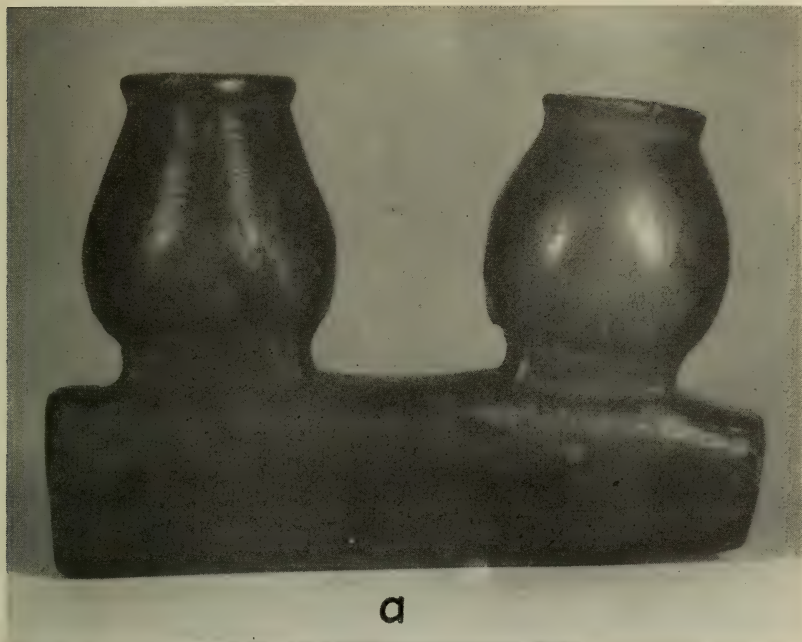
1910. Material culture of the Blackfoot Indians. Amer. Mus. Nat. Hist., Anthropol. Pap., vol. 5, pt. 1.
1912. Ceremonial bundles of the Blackfoot Indians. Amer. Mus. Nat. Hist., Anthropol. Pap., vol. 7, pt. 2.



a, Straight pipe from a Blood Indian bundle. (Courtesy Denver Art Museum.) *b*, Straight pipe from a Piegan Indian Catchers' Society bundle. (Courtesy Museum of the American Indian, Heye Foundation.)



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a, Blackfoot double pipe. (Courtesy Historical Society of Montana.) *b*, Piegan woman's pipe. (Courtesy Museum of the American Indian, Heye Foundation.)



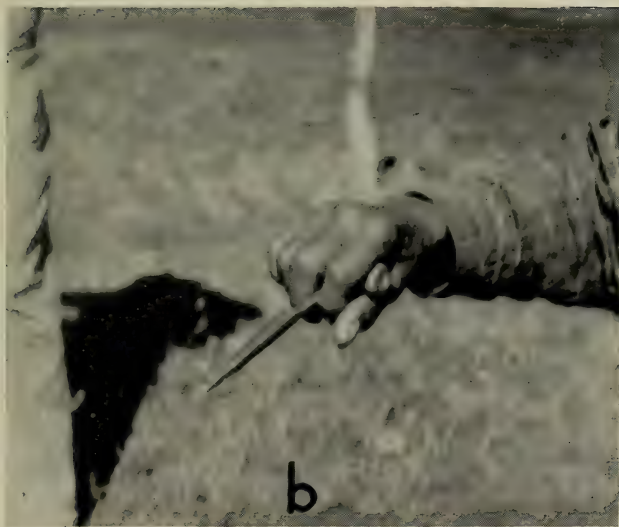
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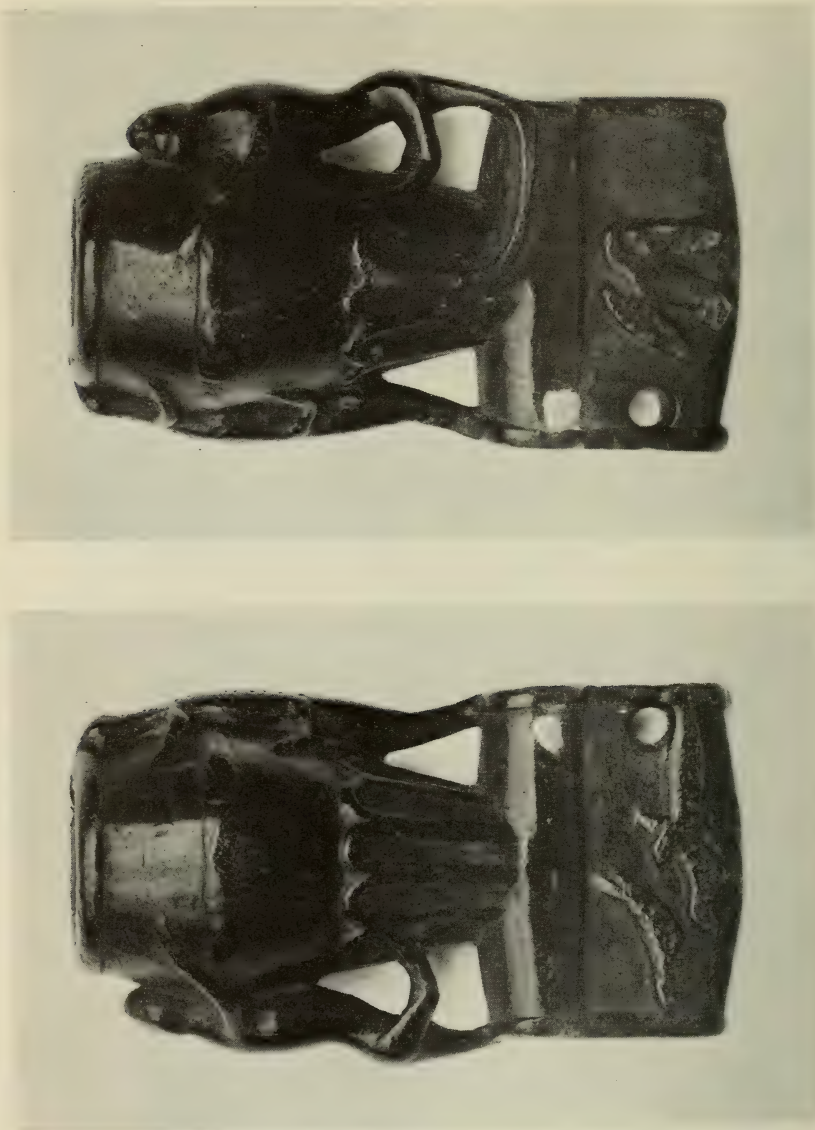
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Smoke-blackened pipe bowl of Micmac type from the Passamaquoddy of Maine. (Courtesy Museum of the American Indian, Heye Foundation.)

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THE WARIHIO INDIANS OF SONORA-CHIHUAHUA:
AN ETHNOGRAPHIC SURVEY

By HOWARD SCOTT GENTRY

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PREFACE

With the publication of Gentry's Warihio ethnography, attention is directed to what has been one of the many obscure areas in north-western Mexican ethnology. Information on the Warihio has been limited almost exclusively to brief mention of the tribe in relation to surrounding peoples. The present report, based on first-hand contact with the Warihio, should prove useful in placing the group in proper ethnological context.

Existing literature on the Warihio falls into two main categories: historical sources based on documents of the colonial period and references to the group which have appeared in a few anthropological publications since rediscovery of the tribe in the early 1930's. Historical sources include both the accounts of the original Spanish chroniclers and the secondary works of such contemporary scholars as Almada (1937), Bannon (1939), Dunne (1948), Decorme (1941), Ocaranza (1942), and Sauer (1934, 1935). Except for Sauer's ethnohistorical studies, which remain the definitive works on tribal distributions in the area, the historical works touch upon the Warihio only incidentally as neighbors of, and participants in, the missions of the Chínipas region. Of the half dozen anthropological sources which refer to these Indians, only Kroeber (1934), Passin (1944 a, b), and Sauer (1934, 1935) have made brief attempts at examination and interpretation of Warihio data.

Spanish colonial sources, especially Perez de Ribas, have outlined the tribal picture in the area at contact and have illustrated the impacts of the conquest on these peoples, events which led to at least the partial missionization of the Warihio. Spanish exploring expeditions at the end of the 16th century found the barranca regions on the upper Mayo and Fuerte Rivers inhabited by various small entities of Indians, most of whom were apparently linguistically and culturally affiliated with the Cáhita peoples of the Sonora-Sinaloa coastal lowlands or with Tarahumare-like groups in the Sierra Madre to the east. Sauer (1934) and Bannon (1939), using colonial sources, have sorted out these groups—one of which was the Warihio (termed Varohio, Hio, or Hia by early Spanish writers). The tribal groups living on the western edge of the mountains and the adjoining lowlands were the Conicari, Tepahue, and Macoyahui, all of whom were

probably Cáhítans (Sauer, 1934). The mountain tribes inhabiting the barrancas were the Chínipas on a north branch of the Fuerte River, the Guazapar and Témori to the east next to the Tarahumare, and the Warihio to the north of the Chínipas area. Below Chínipas on the Fuerte drainage were the Huíte of unknown linguistic affiliation and the Zoe, whom Sauer places tentatively with the Cahitans. As other writers have pointed out, many questions are unsettled in regard to these groups and little can be said about them with certainty. It would appear that the Chínipas carried on more intensive agriculture than the others and had a higher culture generally (Bannon, 1939; Sauer, 1934). To the north were the Pima Bajo and to the east the Tarahumare, occupying much the same area as today. The Chínipas, Guazapar, Témori, Huíte, and Zoe disappeared in the colonial period through miscegenation or consolidation with other Indian groups, while the Cáhita-like peoples have evidently become Mayo.

The Warihio of contact times seem to have occupied the same general territory as they inhabit today—the upper barrancas of the Mayo and the upper Chínipas branch of the Fuerte and adjacent mountains. It is clear from colonial reports that the group was considered a distinct people separate from both the Chínipas and the Tarahumare, although some sources speak of mixture with the latter (Bannon, 1939; Decorme, 1941). The exact relationship of the Warihio with the small neighboring tribes is obscure because no linguistic material is known from the extinct groups. Sauer (1934) and Kroeber (1934) have tentatively placed the Warihio, Guazapar, Chínipas, and Témori in a common language grouping, but their conclusions are based on historical similarities rather than linguistic data.

Mission activity in this region began in the 1620's when Jesuits from the Spanish outpost at Toro in Sinaloa moved into the Chínipas valley and established churches. Priests from Chínipas formed a mission for the Hios (i.e., Warihios) in 1627 at a spot some 4 leagues up the river from Chínipas (Bannon, 1939). In 1632 a combined attack of the Warihio, Témori, and Guazapar destroyed the missions and drove the Spanish from the Chínipas area. Most of the Chínipas accompanied the Spaniards to the Sinaloa missions and were relocated there. The Spanish returned in 1670 to find that the Tarahumare had moved into much of this country. This time priests gained a firm hold on the region, and the reduction of the Indians was rapidly accomplished. A mission was established among the Warihio at Guadalupe about 20 miles to the north of Chínipas, and about three hundred Indians settled there. A second Warihio mission was founded at Loreto, with a visita at Santa Ana (Bannon, 1939; Decorme, 1941).

Evidently, portions of the Warihio remained under mission influence

until near the close of the colonial period. A list of church operations in 1784 reveals missions still present at the locations of Guadalupe, Loreto, and Santa Ana with several hundred Indians still listed as residents of these places (Ocaranza, 1937).

There is no other known report of the group until they were located by Sauer and Kroeber about 1930. Presumably they had been shielded from acculturation to some extent by their isolated location. However, approaches to the area from the east are not so difficult as those on the rugged western slopes, and it can be speculated that contacts with Chihuahua were common. Considerable mining activity took place in the general area during the 19th century, with the extensive mines at Ocampo only a day to the north. In addition, an American company was working mercury holdings in the heart of the Warihio country at Arechuyvo, Chihuahua, in the 1890's with a number of Indians drawn into the operation.

The importance of the tribe to the ethnology of northern Mexico lies in its geographical location which places the group in a possible intermediate position between the larger Cáhita and Tarahumare divisions—a situation with implications for the reconstruction of Uto-Aztec cultural history. Most contemporary discussion of these Indians has been concerned with this question, with writers disagreeing as to whether a distinct people is represented here or merely a subgroup of the Tarahumare. The former view is expressed by Beals, Tax, and Redfield (1943) and Kroeber (1934), while Almada (1937), Dunne (1941), Passin (1944, a), and Sauer (1934) are inclined to stress Tarahumare similarities. Kroeber, who collected and analyzed Warihio word lists, points out that the language is most similar to Tarahumare but is not merely a dialect of this group as some have proposed. On the grounds of the Warihio consonant scheme and the accentuation of syllables, he states that the language “seems more archaic than Tarahumare, rather than derived from it: perhaps it is a surviving proto-Cáhita-Tarahumare” (Kroeber, 1934, p. 13).

Passin, laboring under the handicap of an incomplete list of terms, attempted to fit Warihio kinship terminology into an analysis of Uto-Aztec systems, placing it tentatively nearest to Tarahumare in the general Cáhita-Opata-Tarahumare division in contrast to Pima-Tepehuan and Cora groups (Passin, 1944 b). Passin (1944 a) further observes that it is his impression after having visited both groups that the Warihio are but a localized and more acculturated division of the Tarahumare, speaking a language which differs no more from Tarahumare than varieties of Tarahumare differ from each other.

Other published references to the Warihio are apparently limited to mention of the group in a few contemporary Mexican sources in

connection with geographical works or census reports. Modern Spanish sources spell the word as Uarijio or Guarihio in place of the Varohio of colonial writers.

In addition, workers from the Summer Institute of Linguistics have collected Warihio material in the vicinity of Arechiuvyo, Chihuahua, within the last few years. Some of this material, together with a word list collected by Jean B. Johnson at San Bernardo, Sonora, in 1939, is available in the Department of Anthropology, University of Arizona, Tucson.

It is to be hoped that Gentry's material will interest other workers in this group. A fieldworker today would find the area somewhat more accessible (by charter air service) and the Warihio more acculturated than at the time of Gentry's visit a quarter of a century ago, but he would find them still secretive and retiring and in most cases still living within the culture patterns of the Sierra Madre Indians.

April 17, 1961.

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THE WARIHIO INDIANS OF SONORA-CHIHUAHUA: AN ETHNOGRAPHIC SURVEY

BY HOWARD SCOTT GENTRY

INTRODUCTION

The data on which this report is based were collected after the rediscovery of the Warihio Indians in 1930 by Dr. Carl Sauer and Dr. A. L. Kroeber, of the University of California, and their subsequent suggestion to me that I gather information concerning this little-known tribe. I collected the notes as opportunity afforded in the course of my general biological fieldwork in the Rio Mayo country of northwestern Mexico. This is a report of three field trips made during the period from October 1934 to October 1936.

The information as it stands perhaps introduces more problems than it solves. Any ethnographic study of northern Mexico is partly a problem of sifting Spanish elements from the aboriginal. Added to this, in the field under discussion, is the influence of neighboring Cáhitán tribes, making a complex general problem, which this paper only incidentally outlines.

This is a report of direct observations and of what I heard and learned. It is therefore partly hearsay, so, to reduce errors to a minimum, I have checked one source with another, a method which with time and patience leads to verity. I have not been aggressive in obtaining information, but rather as a questioning listener I have recorded it as it came or appeared, believing that by such slow absorption I would snare more of truth and less of falsehood. Usually, only that part of hearsay will be entered which has verified itself by being spoken from two or more informants, but there is still a part which must depend for its right of place solely upon my judgment as established by general familiarity with the field. Finally, it might be well to remember that there may be a difference in what a man sees and hears, and what others read in the writing thereof.

INFORMANTS AND ACKNOWLEDGMENTS

Chief among the informants are the following:

Bartolo Hernandez, Mexican.—“Mayordomo” of the isolated valley of Guasaremos. For about 15 years he was a resident there with the

scattered Warihio as his nearest neighbors and as his laborers on the land. Before that he came from Jalisco soldiering with Obregon and Pancho Villa. Now his sons play Warihio music on Warihio violins and they all dance on occasions with the Indians. He keeps an ordered place, is a willing and intelligent informant, generally reliable but in inference fallacious.

Carlota Argüelles, Mexican.—Spinster of an old Mexican family owning land from San Bernardo north into the Guajaráy country. For many years she has lived in San Bernardo. In her youth her father kept ranches among the Warihio, some thirty-odd years ago. Hence her knowledge is more of recollection and of a time when the Indians were more abundant. I have found small grounds to doubt her assertions. [Now dead.]

Juan Argüelles, Mexican.—Of the same old family as Carlota and one-time "presidente" of San Bernardo. He, too, lived his childhood among the Warihio and Macoyahui from Chorijoa north along the Guajaráy. He has a flair for knowledge, a love of history, and talks much of early days and of the times of his fathers and ancestors; some of his talks are interesting historically. He appears sometimes to confuse the Mayo, Macoyahui, and Warihio tribes, so one cannot always know of which he is speaking. A prolific informant whose words need some sifting. [Now dead.]

Emiliano Bourbon, Mexican and Indian.—A man of simple slow wit, part sagacious, part unconscious. As a boy he was reared by his Warihio mother. Later he moved to San Bernardo, where he has dwelt since with a Mayo wife and more recently with a Warihio wife, who reprimanded him for teaching me dirty words. He is one of the best native linguists of the Rio Mayo country, claiming a knowledge of Tarahumare, Warihio, Mayo, and Spanish. He knows a great store of native plant and animal lore. In general his volunteered information is acceptable, but, if pressed, his pride in his linguistic and botanical knowledge may induce him to invent. On the whole he proved to be one of the richest and most interesting personalities, locally respected for his knowledge of plants.

Licha Acuña.—Her mother was a Warihio, her father a Mexican. She is now married to a Warihio and lives in Carimechi. A laughing, approachable person who liked to tell a tale, she provided words, stories, opinions, pottery, basket weaving, and entré to her husband's retiring Warihio family.

Esteban Suja, Warihio.—Husband of Licha Acuña in Carimechi. A small shy Warihio man, who spoke little and truthfully, and who twice led me up a mountain for plants. He is clever at woodwork and made possible notes thereof, not without difficulties, however.

When I first saw his violin, I asked him who made it. He replied, "Oh, the people around here make them." I asked where? "In Conejos, in San Luis, any place around here." Several days later his wife told me that he had made it.

Lusiano Guireña, Warihio.—Resident in Guasaremos; about 40 years of age with five children. He held a *tuwuri* ceremony in Guasaremos while we were there and accompanied me as "arriero" on pack trips into the sierras. He provided words, general information, verification, and myths. A reliable informant. [Now dead.]

Cosme Valdez, Warihio.—A chief or "selyeme," living near Guasaremos. He conducts the ceremonial "tuwuris" in that neighborhood. He contributed a part of general information, ceremonial ritual, terminology, and some information on medicinal plants.

Juan Campa, Warihio.—An old blind fellow formerly of Chorijsa but now living with Emiliano Bourbon in San Bernardo. He is a sincere and conscientious informant speaking three tongues, Spanish, Warihio, and Mayo. He sings Mayo and Warihio songs. He is very willing to talk, but is sometimes hard to understand for the babble of age. Some of his tales are highly significant as folklore. [Also deceased since these notes were written].

In addition, there have been those innumerable informants whom any explorer will meet who passes a year of knowledge-hunting in any outland. These people, together with the above-listed informants, hospitably facilitated the travels of my wife and me in Mexico and won our sincere appreciation. He who gives food and shelter to the strange outsider is indeed a person of high virtue; of this type were our Mexican neighbors.

My thanks go also to several people who helped to make this inquiry possible: Mr. Paul C. Standley, of the Field Museum in Chicago (now that city's Museum of Natural History), identified a large number of collected plants; Drs. Carl Sauer and A. L. Kroeber, of the University of California, lent their interest and stimulation to the project; Mrs. Rhoda Adamson, of Los Angeles, contributed film and camera, thus making many of the accompanying photographs possible; Dr. Edward H. Spicer, of the University of Arizona, has lately advised in rearranging the manuscript for publication; Marie Gentry, my wife, assisted with the manuscript and faithfully accompanied me on the extended journeys into the comfortless wilderness.

NOMINAL NOTE

Synonyms of Warihio:

Varohio; Carl Sauer (1934) does not explain his selection, probably taken from a historical Spanish source.

Varohio; A. L. Kroeber (1934) apparently follows Sauer and Beals in usage, but records it also as Huarahia and as Huraijia or Guarihia. "Ma'kura we" is an orthographic spelling of local idiom for a different (?) people, recognized under Spanish spelling as Macoyahui. The present-day Indians are careless in expressing their tribal affinities to outsiders. Inhabitants of the lower towns have lost nearly all tribal consciousness. A Warihio may assent to being a Mayo or a Tarahumare.

Varohio; Ralph Beals (1932 a) apparently follows early ethnographers from Perez de Ribas (1645) on.

Warihio is so rendered in these notes as consistent with the general orthography used in recording the language and as it has been heard pronounced hundreds of times by them to whom the word is a habit, the natives, thus further corroborating Brand and Kroeber. The terminal vowel may be pronounced *o* or *a* (*û*), especially as a gender agreement due to Spanish influence or gender designation. Since the *o* is more generally spoken it is given preference as a general term. An old Warihio in Platonita gave a different appellation for his people, but it was forgotten before a notebook was reached. An attempt to etymologize the word is interesting. Wari alone means basket. Hio suggests Hios, which means in either a specific or a general sense a certain group of people about the Rio Mayo. Basket People is a plausible but uncertain interpretation.

The following key to pronunciation shows the orthography used in writing the Warihio words recorded in this report :

a as in *ah*, father, odd
 e as in *get*, bell, *says*
 e as in *grey*, *pay*, *wait*, *fame*
 h as the English aspirant
 i as in *police*, *greet*, *meat*
 i as in *hit*, *tin*, *miss*, *cyst*
 oi as in *boy*, *oil*, *oyster*
 o as in *oat* blow, note

au as in *out*, *now*
 u as in *true*, *food*, *rule*
 ñ as in *but*, *under*, *son*, *other*
 g as in *go*, *gather*, *egg*
 s as in *so*, *toss*, *pencil*, *miss*
 ch as in *chin*, *church*, *chew*
 c as in *tack*, *cold*, *break*, *kite*

d is pronounced about as in English, though it has been influenced by the softer Spanish d.

r and l are inconstant elements, one becoming the other in a change of localities or of inflection, or the two combined in the extreme of Spanish lingual r tendency, until the sound is neither l nor r but a perfect combination, as in "pero." This in turn tends to slide over to the soft Spanish d, as in "chirowi."

' The apostrophe following vowels indicates an aspirating elongation often accompanied by accentuation and tonal variation. Due to Spanish influence there is a tendency to drop the aspirant, as though to make the word easier to the questioner.

PEOPLES OF THE RIO MAYO AND WARIHIO DISTRIBUTION

The peoples of the Rio Mayo are a mixed lot. The dominant heritage is American Indian with an occidental infusion from Spaniards and to a less extent from Germans, Englishmen, Frenchmen, and Italians. A dilution with Asiatic blood from Chinese, Japanese, and Hindus appears to have come more recently. A few Negroes and even a few Arabs were observed. Crossbreeds and individuals crossed between combinations of races can be seen, especially about Navojoa, attesting to the lack of racial distinction in mating. Besides the composite Mexicans, whose tribal or racial identities have been lost, there are three Indian tribes now known to inhabit the Rio Mayo country.

Mayos range all over the lower country up to Conicari at least, and northward to near Cedros and Tesopaco. They were the first Sonoran tribe to ally themselves with the Spaniards and assisted the conquistadores materially in vanquishing the surrounding tribes. Numerically they still form a large part of the population but are rapidly being assimilated into the Mexican towns, and their indigenous culture has largely retreated before the modern Mexican one.

The Warihio inhabit the barrancas from Conicari eastward to the basin of the upper Rio Mayo and the adjacent mountain slopes. Their tribal integrity is perhaps stronger than the Mayo, due apparently to their isolation in the barrancas, where the aggressive Mexican culture has scarcely entered.

The Tarahumare live in the high mountains and barrancas of southwestern Chihuahua, bordering the Warihio on the eastward. They were observed to be living in scattered houses of pine planks and logs in Sierra Cajurichi. Though unreported from the area, they probably also inhabit the Upper Mayo Plateau, at least in diluted form. Around Memelichi they appeared to be living on the same existence pattern as their Mexican neighbors and were reported to intermarry with them.

These three tribes are stratified ecologically. The Mayo are Thorn Forest people, the Warihio Short-tree Forest, and the Tarahumare largely Pine Forest.¹ It is rare that tribes and environments are so closely correlated. That they were so oriented stimulates inquiry to determine just how partially or completely cultures may be wedded to habitats. In the aboriginal setting 500 years ago the Warihio were apparently purely hunters and gatherers, judging from the information reported below. The Tarahumare were largely so, but with some

¹ The vegetation of the Rio Mayo has been worked out in some detail in "Rio Mayo Plants" (Gentry, 1942 a).

agriculture, and the Mayo were a more settled people, truly agricultural, but still drawing profusely upon the raw resources of the native wild plants and animals of the coastal Thorn Forest. While the Tarahumare descend or live annually in the barrancas and the Mayo have access to them by journey, the aggregate of their contact with the barranca habitat would remain essentially less than with the Warihios. The knowledge and utilization of the barranca plants would obviously be most available to and best understood by the Warihios. Many of the lowland species also overlap there with the highland, so that one would expect them with the richer flora to have more numerous plant resources to draw upon, and this in part may have retarded their disposition to accept the neighboring "milpa" culture. The wild plants utilized by the Warihio are listed in the following pages, and while their number is considerable, especially of substantial food plants, the list probably by no means includes all that they used.

The Warihio are still given to short local migrations, as was evidenced by groups in the great stony land of the Arroyo Guajaráy. Families visited in 1934 at Conejos and another group at Rancheria in 1933 were reported to have left those localities (the Conejos fishing group going over to the Rio Mayo) 3 or 4 years later. The exact reasons for their movements were not ascertained, but it might well have been because of depleted wild food supplies. Such local migrations are typical of the hunting and gathering tribes.

The adaptation of the milpa culture to the barrancas is laborious and difficult. Except for small patches of alluvium marginal to the river and its arroyo tributaries, all planting must be done on steep, usually rocky slopes, which first must be cleared of the heterogeneous deciduous Short-tree Forest. The slope is commonly 30 to 60 degrees from the horizontal and the milpa must be transient, for with a few plantings the fertility of the soil is largely exhausted and new tilted milpas must be cleared. This arduous procedure may have slowed the adoption of the milpa by the Warihio.

The striking difference of the precipitous Warihio terrain to that of the Mayo plain and valleys could not but result in certain physical differences between the two peoples, both of whom still retain the walking habit. Compared with the rather slender Mayo, the Warihio are short, with the lifting muscles of the thighs powerfully developed. The Warihio travel up and down the great canyon slopes with relative ease. Some, as Lusiano, had traveled as arrieros over stretches of the level trails of the plains to Navojoa and complained of the tiresomeness of walking there. Walking up and down hill allows respective muscles to rest alternately, while upon the level the same muscles

must continue without surcease hour after hour. Likewise, the Tarahumare are fleet and tireless in the mountains, but are reputed to tire quickly upon what is to them the hot, monotonous coastal plain.

The full impact of these three habitats upon the respective tribes remains to be determined. Such cultures as the Warihio do not live far beyond the immediate raw resources, and the whole relationship can remain certainly a fertile field for further investigation.

Extinct peoples are listed by Carl Sauer (1934), the exact identities and relationships of which remain obscure. Their names may represent people from a particular area, or clans, or even tribes, all, however, belonging to the Cáhitan group of the Uto-Aztecan language family (as are the above-listed tribes). They were the Bacirooms in the vicinity of what is now Alamos, the Macoyahuis about Macoyahui, the Conicarís about the junction of the Rio Cedros and the Rio Mayo (these are all in the Mayo range), and the Tepahue of the northern Rio Cedros. These last may still be represented by a group of families encountered a few miles south of Tesopaco, who said they were not Mayos nor Mexicans proper, that they did not know just who they were, that their progenitors had spoken a tongue of their own, but that not one among them any longer knew any part of it. Pueblos of Tesopaco referred to them as "coyotes" and treated them rudely generally. They live only several miles above the settlement of Tepahue.

Fossil man has been evidenced by the remarkable discovery of human remains in the Quarternary lime beds at Chinobampo. They were found in a natural deposition suggesting water-laid bone in a deposit of argillaceous lime, under such conditions as to preclude the possibility of recent burial, in an advanced state of mineralization quite comparable to the Pleistocene mammalia associated in the same deposit. The fossil skull was that of an American Mongoloid, indicating that man has inhabited the Rio Mayo at least intermittently since the periods characterized by such animals as the extinct horses, mammoth, camel, glyptodon, large carnivores, and others of the American Pleistocene.

It was not possible for the writer to visit all the Warihio localities, so the most authentic reports available were accepted (table 1).

Distribution.—The Warihio people inhabit the valleys and barrancas of the Rio Mayo country from Macoyahui in Sonora to La Trompa in Chihuahua, about latitude 28° N., and the upper Chínipas Basin in Chihuahua to the south. Their present related neighbors are the Mayo on the west, who within the last half century are carrying intercourse inland to the Arroyo Guajaráy tributary, while on the east in the high sierras, the Tarahumare tribe abides. Until a few years ago

TABLE 1.—*Census of Warihio localities with the number of houses or families resident in each*

Localities	Number of houses or families	Localities	Number of houses or families
San Bernardo*.....	8	Mesquite*.....	2
Chorijoa*.....	2	Platonita*.....	5
Guajaray*.....	3	Saguacoa*.....	3
Todos Santos*.....	1	Guisiego*.....	3
Conejos*.....	5	Babfcora.....	3
Rancheria.....	3 ?	Tesoruco.....	2
Baniri.....	**1	Tiruta (a word for blanket).....	3
Setajaqui.....	4	Ensinal.....	1
Wataturi.....	2	Mocorichi.....	8
Tapara*.....	2	Saus.....	1
Aquihavo*.....	3	Jecopaco.....	4
Cuchuwari*.....	1	Gachavachi.....	15
Yuromo*.....	2	Arechuybo.....	15
Wokobaqui*.....	1	Salivo.....	6
Carimechi*.....	5	Sierra Canelo*.....	3
San Luis Barbarocos*.....	5	Loreto*.....	18
Barbarocos.....	3	Santa Ana.....	15
Sierra Garcia.....	8 ?	San Augustin.....	8
Sierra Escura (Obscura ?).....	12 ?	Macoyahui.....	6 ?
La Trompa.....	12	Conicari.....	4 ?
Bachoco (from Mayo meaning bad water).....	3	Sejaqui.....	17 ?
Guasaremos*.....	2	Total.....	230

*Localities visited by author.

**Large family of Hilario Corpo with a Mayo wife.

the Macoyahui are reported to have been present on the south, in the vicinity of Macoyahui and Los Tanques in Sonora, but they are reported to have moved into Chihuahua near Tubares, fleeing the strife of revolution. Throughout the Warihio country there is an infiltration of Spanish-speaking Mexicans, mostly casually occupied in growing maize and cattle in the general Mexican pattern, but whose rude culture is touched with Warihio elements. Further details of Warihio habitation can be found on map 1.

No Warihio towns have been observed, unless the compact cluster of little farms in Loreto be defined as such (pl. 29, *a*). Each house or brace of houses sits with the owner's milpa of corn and beans. The 20 or so houses are scattered along 2 or 3 miles. Centrally located are seven or eight houses of Mexicans and a school, forming a settlement. The Warihios are solitary people, undesirous of even their neighbors' company except in the social vehicle, the tuwuri rituals. Related families commonly live in the same locality, each with a house from a hundred yards to a league apart. These localities, or rancherias, are named with a Spanish or Cahitan origin. Yet in some cases Warihios have collected together in Mexican towns, as in San Bernardo, where they have been broken to the gregarious Mexican existence.

Observations in the field corroborate Sauer's figure (1934, p. 8), of six individuals to the family, which here used will give a total of 1,398 Warihio persons recorded in the foregoing list.

This does not include localities probably existing, but which were neither visited nor reliably reported, the majority of which lie still north of Arechuybo and La Trompa. To judge from the general reports and slight mixture of Tarahumare in the northern localities, an addition of some two or three hundred should be allowed.

Tentatively we may conclude as existing a population of about 1,600 Warihio inhabiting an area of a little over 2,000 square miles—1.5 Warihio per square mile. Except for two localities, Santa Ana and San Agustín, this does not include the area nor the Warihio of the

Rio Chínipas country, whose present numbers are unknown. The two exceptions are sufficient to show that the Warihio are still in habitation in the Rio Chínipas country, though it is very doubtful if their number would swell the total to Sauer's estimated 7,000 total Warihio population (Sauer, 1934, pp. 5, 24).

There are in addition in this area about an equal number (conjectural) of Mexicans, but the majority are marginal to the area with only an occasional isolated "ranchero" living in the Warihio's precipitous ranges. Doubtless these, with Mayo as intruders, have greatly reduced the Warihio area and disseminated the population in the last century. European pandemic diseases carried by the early Spaniards have from time to time ravaged the Indian populations (Sauer, 1935, p. 11). Throughout the country it is a common saying that before the year of the cholera (185-) there were many more people than now. Numerous ruins, in the form of low crumbling walls of stone, corroborate these reports further (pl. 29, b).

HABITAT

The land of the Warihio consists of barrancas, arroyos, canyons, steep stony slopes, and cliffs that darken streams or rim the old volcanic mountain tops. It is an enormous succession of diverse terrain shut into a wilderness secrecy, whose every regional door is an arduous "camino." The complex dissection is indicated in map 2.

ARROYOS

The arroyos, which are but canyons opening to wider channels in the foothills, are numerous and variable. At bottom they are a broad white glimmering bed of gravel and river rock with a small stream meandering through. The water flow, particularly in the dry seasons, may be hidden for distances under the gravel, yet he who travels the arroyo trails seldom need thirst for more than a few hours, since the limpid water of rock-tank pool or gravel spring is widespread. In the rainy season the arroyos carry high crests of floodwaters. Along the sides are margins of alluvial soil supporting thorny moundlike thickets and trees. In the hot dry seasons the arroyos are green oases in an otherwise naked vegetation seared under a great drying sun. For when the roots of the hillside plants in thin gravel soil are drained dry, the arroyo phreatophytes still have their roots deep in the underground flow of the arroyo. Some of the common members of this plant group are: the wicked-thorned gumbro (*Celtis iguanea*); chirowi (*Acacia cymbispina*); vinorama (*Acacia farnesiana*), the perfume flowered tree; palo fierro (*Pithecellobium undulatum*); garabato (*Pisonia capitata*); papache (*Randia echinocarpa*); bata-

yaqui (*Montanoa rosei*); batamote (*Baccharis glutinosa*); jeco (*Hymenoclea monogyra*); and cacachila (*Karwinskia humboldtiana*).

Many small mammals run in the thickets: mice (*Peromyscus* and *Perognathus*); woods rats (*Neotoma*); rock squirrels (*Spermophilus*). Foxes (*Urocyon cinereoargenteus*); cholugos (*Nasua narica*); and raccoons (*Procyon lotor*) feed often upon the gumbro berries. Seen along the arroyos are tracks of bobcats (*Lynx*) and, less often, of pumas (*Felis oregonensis*) and jaguars (*Felis hernandesii*). Many tropical birds such as chachalacas (*Ortalis vetula vetula*), "coas," and parrots frequent the forest, while hosts of others, such as doves, quails, sparrows, towhees, and flycatchers, are active in the thickets and their margins.

Many trees, some of which are used for their food products by the natives, grow also along the arroyos, either as solitary individuals or as the beginning of the vast Short-tree Forest spreading everywhere over the hills. Among the arroyo trees are: guasima (*Guazuma ulmifolia*); guamuchitl (*Pithecelobium dulce*); palo colorado (*Caesalpinia platyloba*); pochote (*Ceiba acuminata*); tescalama (*Ficus petiolaris*); and garabato (*Pisonia capitata*). Arroyo Guajaráy is a notable stream of rapids and pools carrying a good supply of water. It winds about in a gravel bed bordered by dark volcanic cliffs one hundred to one thousand feet high. Great blue herons patrol the water-course like winged superintendents. An eagle's nest was observed in a wild fig tree high on a chocolate-colored cliff, its roots fastened to the rocks like tentacled clamps. Fish of seven or eight species live in the water and are preyed upon by eagles, kingfishers, herons, mergansers, and Warihios.

CANYON FEATURES

The canyons, as origins of streams, dip deeply into the towering mountainsides. Certain useful plants are found therein which do not commonly grow in the lower sunnier arroyos: chuna (*Ficus cotinifolia*); bebelama (*Vitex mollis*); lechuguilla (*Agave* spp.); arellane (*Psidium sartorianum*); and the tall bamboo grass (*Arundinaria longifolia*). The lesser canyons do not rise into the sierras but issue as tributaries from the lower hills, while the greater ones rise into the high mountains through the oak belt into the pines, high beyond the highest Warihio hut.

HILLS

The hills at the lower level first are formed like "sombreros" resting on gradual slopes; such may be observed about San Bernardo and Chorihoa. But immediately they begin to link themselves together and become endless series of ridges flanking their mother sierras, so

numerous and complex in ancient erosion formation, that a traveler scarcely knows just where he is hidden or from which direction the tortuous trail has brought him. They are covered uniformly with the subtropical Short-tree Forest, whose tilted leagues in "las aguas" are seas of steaming green. Here grow in abundance the pochote (*Ceiba acuminata*); amapas (*Tabebuia palmeri* and *T. chrysantha*), red and yellow flowered respectively; palo joso (*Conzattia sericea*); torotes (*Bursera* spp.); mauuta (*Lysiloma divaricatum*); palo santo (*Ipomoea arborescens*); vara prieta (*Brongniartia alamosana*); the bearded cactus (*Cephalocereus leucocephalus*); and the giant cactus (*Pachycereus pecten-aboriginum*), the bristly fruits of which have been used as combs. Upon the trees are epiphytes of orchids (*Laelia autumnalis*), and the bromeliad hichiconi (*Tillandsia recurvata*).

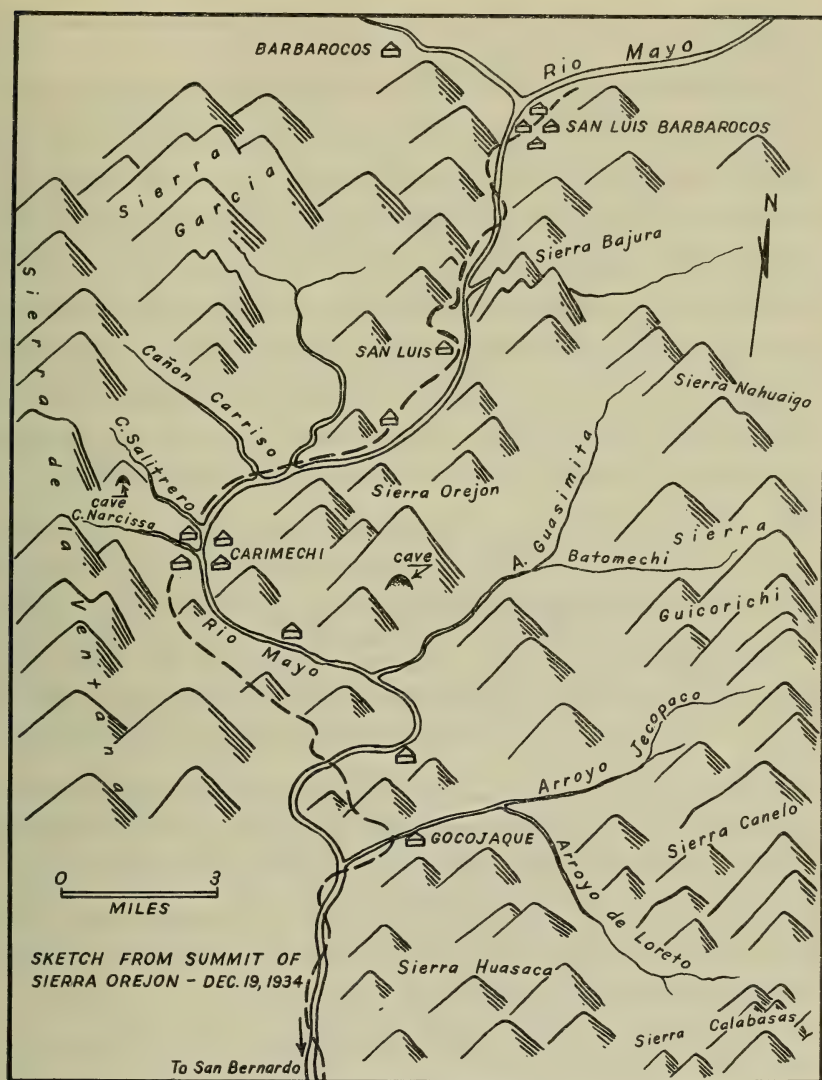
CLIFFS

Throughout the country are cliffs, either as rim fragments of old high volcanic strata footed by steep talus slopes, or as arroyo or canyon sides cut down by water and weather fraction. Even upon such vertical terrain grow plants useful to the woodland Warihio, such as, amole (*Agave vilmoriniana*), Sapuche, and palmillo, all of which are discussed later. In them, also the wild bees and birds find refuge. In the base of these cliffs there sometimes occur caverns and caves, some of which show evidence of earlier primitive occupation. These are discussed later.

SIERRA FEATURES

Above or backing the Sonoran subtropical slopes are the sierras of the Sonora-Chihuahua border area, the Sierra Madre Occidental. Midway there is a belt of Oak Woodland consisting of scattered oaks and other trees with an intervening cover of rather harsh grasses. It, too, may be steeply sloping or with summit benches and mesas, over which rancheria trails may lead. Its soils are generally unsuitable for tillage. Besides the many species of oaks there are palms (*Sabal wresana* and *Erythea aculeata*); palmitas (*Nolina matapensis*); and algarroba (*Acacia pennatula*); and many varieties of lechuguilla (*Agave* spp.). Nearly all of them are put to some use by the Warihio. Generally it is pleasant, open country of equable temperatures and comparable to our Upper Sonoran Life Zone or Oak Woodland of southeastern Arizona.

Still higher, usually fragmentarily outlined by broken cliffs of volcanic origin, lies the pine zone. This is composed of two mountain ranges subsidiary and angling out southeastward from the main Sierra Madre axis. One range flanks the Rio Mayo on the west as Sierra



MAP 2.—Map sketched from summit of Sierra Orejon.

Garcia and Sierra de la Ventana, while the other borders the Rio Mayo on the east and south in a series of sierras with respective names of Canelo, Charuco (or Calabasas), and Sagaribo.

The temperature of the region is seasonably equable. Normal daily temperatures range between 60° and 90° F.; extremes do not exceed 30° in coldness or 100° in heat. The daily fluctuation is higher in the dry seasons, when the clear sunny days at noon are warm and

the late fall or spring nights are chilly, after the manner of variation in deserts.

The average yearly rainfall is between 20 and 25 inches, an amount estimated by measurement of a year's precipitation and comparison with neighboring localities where Mexican weather station figures are available. Most of it falls in two seasons; the winter rains, "las equipatas," and the summer rains, "las aguas." Normally these summer rains start the latter part of June and last until into the first part of September. Often rain follows daily rain, each coming at about the same hour in the afternoon. There may be summer dry periods of a week or two duration, when the faces of people will turn earnestly toward the high billowing thunderheads over the sierras, hoping for the cooling rain to come and release the heavy heat growing stronger day by dry day. It is the great growing season for all plants, wild and cultivated, so that all life turns as on a pivot to the thunder of "las aguas."

The dry seasons are two: that of the spring—March, April, May, and June, and that of the fall—October, November, and possibly half of December. The spring drought is more severe and as it advances the sun grows week by week in intensity; the soil shrinks, cracks, and dust puffs up under foot. Leaves wither and fall until many plants stand like naked supplicants with mute uplifted arms. Nearly all life is at this time half hidden under protective masks against the drought.

The Warihio area is like a wedge with its apex south where the Rio Mayo issues from its mountain hold. The apex, too, is its natural gateway, sometimes closed with the heavy rains falling in winter or summer swelling the Rio Mayo and its side arroyos beyond passing. In this tight natural geographic unit the Warihio has survived. Out of the warm rains and sun that beat upon him and his earth he draws his food and sustains in part his ancient culture.

PLANTS UTILIZED

CULTIVATED PLANTS

By cultivated plants are meant those planted and tended in fields or cleared areas.

The Warihio word for maize and milpa is the same, "sumu." It is planted with the first summer rains along the river terraces or upon the hillsides, sometimes so steep that the planter's hoe falls level with his head or shoulders as he faces up the slope. Several varieties are grown. Those of the highlands are long-growing, later-maturing, and with short stalk; those of the lower elevations, quicker

maturing and taller. They reflect, respectively, the more enduring soil moisture of the cooler "tierra templada," and the hotter, quicker drying soils of the "tierra caliente." These two broad types of corn are general to the highlands and lowlands of western Mexico. The Warihios also have a variety for popping.

Their basic pattern of corn use is that employed generally in Mexico. The dried grain is used for tortillas, after the seed coat is removed by lime-soaking and subsequent grinding by hand on a legless metate. The tortilla is cooked on a large shallow earthen dish. Green or fresh corn is eagerly and hungrily eaten, but among orthodox Warihios, not until the proper harvest ceremony has been held. The fresh corn is eaten after roasting over hot coals or boiling in ollas. This last may be eaten off the cob or made into "tamales de elote." These are prepared by first shearing the corn off the cob, grinding on the metate, then rolling it into corn husks, which are then dropped into boiling water. The cornstalks are used for animal fodder. The corn whey or lime solution in which corn has been soaked is frequently fed to the starving dogs or pigs.

Maize is the staple crop yet many do not plant enough to carry them through the year from one harvest to the next, and they rely on a little from their neighbors, or on work from the "rancheros," or on gatherings of wild plants. It is not uncommon for late spring or early summer to be famine months.

From maize in Loreto is made a fermented drink, called "tesguino." The grain is put in moist earth under palm leaves and germinated. The sprouts are then dried, ground, cooked, and brewed in ollas for several days with the addition of a little wheat, which they regard as a kind of catalyzer. Tesguino drinking is common among the Tarahumare, but I find no mention of it among the lowland or western Warihio who drink instead another fermentation, "batari," made from Agave.

"Cal" or lime for preparing tortillas is made from natural deposits of limestone, two kinds of which are reported, "cal de agua" and "cal de piedra." The Warihios generally use the former which is softer and found in great quantities in certain localities, as at Sahuacoa. The soft lime rock after mining is burned by heaping it with a pile of cow chips. When the mound has burned down the lime is lifted out of the ashes in soft white chunks and is ready to use for making tortillas. Licha Acuña of Carimechi reported that she makes lime from rocks found along the Mayo riverbed. She puts the rocks in water and boils them for 2 days. This makes the solution for preparing corn for tortillas.

While many of the Mexicans plant their corn in the dry soil before the summer rains begin, the Warihios are reluctant to do so. They say they are afraid of an early drought drying the young plants before the rains are well established. This may be an excuse or rationalization to cover a religious reason, or it may be pure procrastination, but appears rather to be a prudent policy based on sound experience. Planting is preferably initiated with a ceremony conducted by the selyeme, and since this is done according to individual plantings there would be certain delays of one milpa after another.

Juan Campa stated that earlier the Warihio did not have maize but only weywi (*Amaranthus hybridus*), and sauwi (*Panicum sonorum*) as cultivates. The first maize to come was "mais amarillo." Bacasewa, a very old man interviewed in Conejos who did not speak Spanish, also stated that his people did not have maize in the past. However, it was not possible to tell from his remarks whether it was

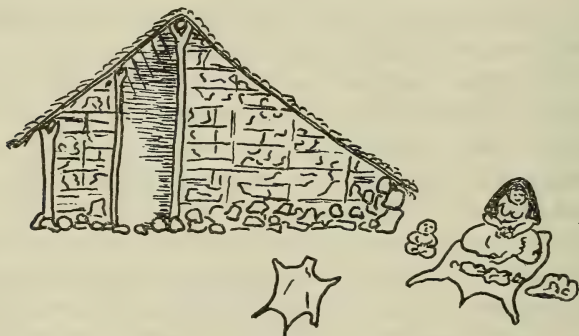


FIGURE 11.—House of Bacasewa in Conejos.

temporary lack over a period of years or whether he specifically referred to a time before the Warihio had learned to cultivate maize. Emiliano Bourbon made indirect allusion to the early lack of maize among the Warihio, when he explained the use of the wild plant guayabillo (*Salpianthus macrodontus*) for tortillas, "before they had maize." When asked if the older Warihios did not have maize, he replied that they did not and it was a thing of memory in the older men, who are now dead. This opinion was repeated or indirectly alluded to several times during travels and inquiries by several or many informants. In the words of Licha Acuña: "The antiguos (Warihios) lived in nakedness, foraging upon the natural wild food, without names, like animals." Licha lived among the most secreted Warihios and her statement neatly and quickly classified them. A Mexican rancher reported that a few wild Warihios still live (1934) in the sierras near Gocojaqui. They have neither milpas nor cattle,

but live by foraging upon the natural wild foods. Their houses are low brush shelters into which they stoop to enter. They go without clothes, are very timid, and do not permit the intercourse of "Yoris," i.e., strangers.

Their isolated position, their unsocial habits, the precipitous rocky terrain are negative conditions making the adoption of maize culture in their barrancas difficult. The long list of wild food plants known to them and which they still annually employ to some extent, the survival of the local migration habit, and many of their material culture traits, as hunting and fishing, are all positive indicators of a simple hunting and gathering culture. About the only question is when the change was made from the latter stage toward that of the more sedentary agricultural habit.

It is the author's opinion that it started with the Jesuits, the effects of whom are discernible in the Warihio in many different ways, as with their ceremonies, the cross, and the Mission in San Luis Barbarocos in the very heart of Warihio land. The shift began then and has with interruptions been continuing to the present, when maize culture with its attendant squash and beans, as well as the encroaching Mexican "ranchero," has finally become universal among them. Their common indolent attention to their milpa and inability to plant enough to carry them from one year's harvest to another attest a general immaturity at the game. After the Jesuits left, in 1767, we could expect some retrogression to older habits, when many of the family groups were still without plantings, and this transitional state continued well into the memory of such old men as Juan Campa and Bacasewa. Contemporaneous through this transitional period were groups, largely defined according to their geographical situation, who did not have milpas and groups who did. The former existed as families or isolated bands withdrawn to the broken fastnesses of obscure barranca canyons, where tillable land was non-extant and where the vast unbroken virgin forest prevailed with all its crude resources of food and sheltering caves. Ever recurrent allusions to these bands were encountered. Juan Argüelles stated. 1934:

The Warihios lived some years ago in two large caves near the top of Sierra Dos Cuates, just west of Arroyo Guajaráy. They carried water up from little wells in the canyon far below the caves, a mile or two. They wore only breech-clouts and practiced no agriculture whatever, but lived off the wild plants and animals in the forest. In one cave far around on the west side of the mountain there is running water. This also the Indians used. They were very timid and kept much to themselves.

Several other such caves were visited by the author, in a few of which Warihios were still living. Near the origin of Canyon Sapopa, high

on the north end of Sierra La Chuna, is a large cavern with a spring nearby. Emiliano and the author found much dust on the floor, fragmentary gray rock, old sherds different from the local San Bernardo pottery, charred sticks, goat dung, and, from the cave, traces of an old trail. Emiliano declared that no one had lived there within his memory and that it was an abode of the "antiguos." All these evidences establish these conservative Warihio bands as an actuality only a decade or two gone by. The conservatives of current times are mentioned repeatedly below. Today it is the groups along the Arroyo Guajaráy and upper Mayo River that show the most coherent "antiguo" culture.

With the more recent appearance of the modern Mexican *ranchero* in the *barrancas*, maize culture has again come more surely home to the lethargic Indian. In conclusion, we can therefore assume that the Warihio were without maize before the coming of the Jesuits, and that since then they have been going through a transitional stage to the cultivation of maize and all it implies in the way of material and social implications carried by the aggressive foreign Mexicans.

Squash (*Cucurbita pepo*) (halauei or ha'la'we), is planted in the milpas and about the houses in primitive gardens. It is the first of their cultivated foods to appear with the summer rains in late summer and with it they start their rejoicing *tuwuri* ceremonies. The young tender fruits are eaten at this time. The fruits do not mature until fall, when they are all picked and stored, if any are left. From the seeds is made the food "pipian" by grinding and boiling. It is common through Mexico. Noted in the high sierra of Canelo was a milpa of beans around whose margin was a zone of squash vines. Lusiano explained that in the cold sierra the squash would grow well only in the ash beds where brush had been burned. The soil apparently lacked sufficient potash.

Beans (*Phaseolus vulgaris*) (muni), of two or more varieties, are planted in little plots of their own. One variety is called by the native Mexicans "frijol serowi" (serowi tegusi) and another "frijol yorimuni." "Muni" and "yori" both stem from the Mayo tongue, the former meaning beans, the latter meaning outsider and is used freely in current Sonoran idiom. This suggests that this variety is a recent adoption into local agriculture.² Beans do best in the pine-lands, although they are also planted throughout the oak belt. They fail or do poorly in the lowland forest of the warm moist *barrancas*, perhaps because proper varieties are not available to the inhabitants.

Watermelons (*Citrullus vulgaris*) are occasionally planted, principally along the alluvial margins of the Rio Mayo. They are set out in small basins dug into the sandy soils and watered by hand, so far as the culture was observed among the native Mexicans. Neighboring Warihios were reported to cultivate them also in the same way. Only one variety was noted, small and white-seeded. They are frequently plucked and eaten before they are ripe, so voracious is the native taste for fresh fruit in the early summer. The Warihio call them "ha'lu."

² A recent collection of seed has been identified as *Vigna sinensis* Endle., the Asian cowpea.

Sugarcane (*sorghum* sp.) (ta sauwi) of a tall thin-stemmed variety is grown by the Warihio on shady moist slopes, usually along canyons. That grown by the Mexicans has a thicker stem of a reddish-purple color and with a higher sugar content. A millet type of *Sorghum* 5 to 6 meters tall was observed at one house. The seeds are ground and eaten as "pinole."

Chiles (*Capsicum annuum*) are often grown in the little garden plot near the house, much as the Mexicans of the region do.

Green onions (*Allium cepa*) are started from seed, often in little raised beds constructed of poles and elevated 1 meter or more above ground, where they are safer from the pilfering of domestic animals. (See "Elevated Structures," p. 112, and pl. 33, b).

Tobacco (*Nicotiana tabacum*) (wi'pa') is cultivated in small enclosures of sticks or poles near the house or in a general garden plot. This is usually done by only one or two members of a community. Only one variety of tobacco was observed, presumably that one which the Mexicans call "macuche" or "maquiche."

Cotton (*Gossypium* sp.) is reported by informants to have been cultivated by the Warihios in the form of two varieties. A few plants were set out near the house or in a staked garden pen. Single or several shrubs by houses in the barrancas were observed by the author, who unfortunately failed to procure samples. One variety is reported to have a relatively short fiber, being brownish in color.

The other variety is said to have a reddish flower and a white fiber 3 inches or more in length, the fibers not extending when the boll has opened but being flexed inward. When the fiber is plucked from the boll the seeds drop free. The seeds were eaten. The fiber was formerly used by the Warihios for weaving blankets and perhaps clothing. The Mexicans used it for making wicks for candles and lamps and as tow for tinder. Many of the barranca people still regularly employ flint and steel for lighting cigarettes or making fire.

Only six green bolls of this long-stapled cotton are said to be required to weigh one kilogram. Recently, Emiliano Bourbon was despatched to procure samples of this cotton. However, the plants which he knew growing as escapes along the Rio Mayo, had recently been washed away. He and others at San Bernardo state that this long-fibered cotton can still be found infrequently as escapes in the forest or about the houses of some of the barranca peoples. I also have reports of a similar long-stapled cotton from the Barranca de Cobre in southwestern Chihuahua, where it is reported cultivated by the Tarahumare. Since this cotton does not appear to be known from any other part of the world, it would appear to be indigenous to our area.

Amaranth (weywi), a variety of *Amaranthus hybridus*, is planted about the house or in the milpa along with maize. It requires considerable water. The flowering spike often turns a deep reddish purple and may bend downward with its heavy load of bracts and seeds. The fine seeds are eaten either whole or ground into flour and drunk with water or milk as "pinole." Sugar may also be added. It is widely distributed in the Warihio range but nowhere extensively cultivated. They say it is too much work to care for in terms of return, that maize is easier, but it readily lends itself to small gardens near the house. Both Indians and barranca Mexicans are fond of it. It would have fitted better into the "antiguo" culture than maize of the laborious milpa, and hence may be an earlier cultivate of the Warihio. Weywi should not be confused with the common wild amaranth (*Amaranthus palmeri*), native to the

barrancas and an ubiquitous weed in the milpas. The former is known to the Mexicans as "bledo," the latter as "quelite."

Sauwi (*Panicum sonorum*) is planted in the milpas or in small gardens and like weywi is valued as a pinole or prepared and eaten in the same way. While generally known to both the Warihio and the barrancan Mexicans, it appears to be quite scarce and its culture is being lost. I found it only upon one occasion, tended in the small milpa of an old couple in Sahuacoa, near Guasaremos. They had in all only a few dozen plants, but sold me a few entire plants for samples. The plants were about 1 meter tall with large panicles of seeds just beginning to mature in late September. Like the corn, they had germinated in June with the first of the summer rains and would therefore require some 90 days to mature. Edward Palmer also collected this grass near Lerdo, Sonora, in 1889, and reported it cultivated by the Papago Indians of that locality (specimens on file in the U.S. National Herbarium). Other collection records of his are from southwestern Chihuahua in 1885, and from Culiacan, Sinaloa, in 1891. It is related to the Old World millet (*Panicum miliacium*), and it may be among the earliest of the New World cultivates. From this standpoint it merits close study. With weywi and conivari it may have preceded maize in the Warihio culture.

Conivari (*Hyptis suaveolens*) is a salvacious plant, known also to the Mexicans as "cham," similar to "chia" (*Salvia chia*), and used in much the same way. The seeds uncooked and unground are mixed with water and drunk. Specimens were taken from the milpa of an old couple near Guasaremos, who said they had planted it and that a few of the other Warihios also did. I also find specimens of it among my collections from the cave in Sierra La Chuna, mentioned above, and from the Mesa Colorado of the Upper Mayo Plateau. They regard the seeds not only as good food but curative for fevers and sluggish bowels. The seeds when mixed with a little saliva are inserted in the eye to remove objects. A hydrophyllic jell forms softly and thickly around the seeds when they are wet.

Job's tears (*Coix lacrymajobi*) is a grass of particular note; it is cultivated solely for its ornamental seeds, used for beads and rosaries. It is known by the Warihio as "pataka." With the large, hard, bluish-gray seeds they make beads and string along with a cross carved out of brasil wood (*Haematoxylon brasiletto*) making a rosary. It is used to decorate the tuwuri cross. The grass is planted and grows without attention in moist places, reproducing by suckers or rhizomes. One plant is said to produce an abundance of seeds. They hang in a drooping spike on stems 4 or 5 feet long. Old Nicolas (Warihio) planted some along an arroyo below his house, but a flood later carried it away. It is reported that a large patch grew in the orchard of El Limon until a few years ago, when the cattle ate it out. It is said still to grow in Sativo, which is near Arechuybo, lying below upon the western side of the Sierra Guicorichi.

This list might suffice for an agricultural people. Yet their practice of agriculture is carried on in a shiftless and naive manner. Witness the pigweeds taking the selyeme's milpa, and the going forth in the spring with the pinch of hunger to forage upon the wild plants.

Except weywi, sauwi, and conivari their cultivates can be recognized as borrowing from their various modern neighbors, who, since the coming of the Jesuits, have been slowly dissolving the original Warihio subsistence pattern. When their cultivations do not suffice they

return readily enough to a more ancient food supply, the wild native plants which grow everywhere about them. The following lists, while they do not exhaust their hunting and gathering resources, are sufficient to show that they still are in some degree wild food gatherers, and that not long ago they were largely or perhaps entirely such.

WILD PLANTS

ROOT AND HERBAGE FOODS

Camote (chichiwo', chichi camote) (*Dioscorea cymosula* Hemsl. ex. Char.).—Climbing vines with annual stems without tendrils and large cordate leaves with the main veins all converging apically and enduring only through the summer and fall. There is a perennial fibrous root crown subtended by long vertical tubers 1 to 2 inches in diameter, which grow downward for 2 to 3 feet annually, the old tuber drying up as the new one forms. The tubers have a soft white fecula. They were and still are eaten either boiled or roasted, especially in the spring months when crop foods were scarce. It appears to have been a principal food of the Warihio. In addition to the cultivated and introduced yam of the Old World, *Dioscorea alata*, there are several species of wild edible yams from southern Sonora to South America, which were known to and regularly used by the inhabitants. They are still found in the markets of the Mexican towns, from Nayarit south and eastward, being dug by the country folk from wild plants and transported to market. In Jalisco and Michoacan they are commonly known as "camote del cerro" or "gualacamote." In Chiapas a native Indian dialect names the edible type "yumi." There are perhaps a hundred species of wild yams in Mexico and Central America, some of which are poisonous. However, all the edible species appear to belong to one group, characterized by annual, vertical, long tubers with soft white fecula, below a perennial crown with adventitious roots.

Cebollin (*Allium scaposum* Benth.).—Wild onion. This species was collected in Canelo and reported to be eaten locally. A sweeter one was reported by Lusiano to grow on the western slope of Cerro Guicorichi. Summer.

Chaqual (palasewa) (*Tigridia pringlei* Wats.).—This is a very showy plant, producing three or four flowers consecutively on a long scapose stem in September. It is common to the moister canyons at elevations between 2,000 and 4,500 feet. The bulb is roasted and eaten.

Chichiquelite (manilochi) (*Solanum gracile* Otto).—A perennial herb of the canyons. The leaves are eaten as greens and Emiliano reported the fruit as edible, but the closely related and similar appearing plant, *Solanum nigrum*, is reputed elsewhere to have poisonous fruit. It and other closely related species occur in the barrancas of the Warihios and all appear to be used indiscriminately as greens.

Chócola, the plant (capia', the root) (*Jarilla chócola* Standley).—A leafy, turgid, summer herb perennial from a cluster of tubers, growing in the shade of the warm canyon forests. The roots are baked in hot ashes, peeled, and eaten. They have a strong vegetal taste, rather bitter and woody, but those tried by the author may have been underdone. The late Dr. Carl Alsberg of the Food Research Institute at Stanford University, generously rendered an analysis of the tubers, which showed them to be unusually high in starch, approaching that of the potato. The fruit is eaten raw. It is a light white,

pudding-like mass of slightly acidic flavor suggestive of lemon with a score or more of seeds embedded in the pulp. It ripens in October and remains scattered upon the ground during the winter for long after the plant itself has disappeared, the tender skin being surprisingly preservative. Fruits of a related species are sometimes seen in the markets of Nayarit and Jalisco. So far as known they come only from wild plants. The plants could well be considered for introduction into agriculture.

Guayabillo (*Salpianthus macrodontus* Standley).—Perennial spreading bush with large fleshy roots 1 to 3 inches in diameter and 3 or 4 feet long. It is reported to have been one of the chief sources of food before they had maize. The root was beaten up, dried, then ground to fine powder like flour. Mixed with a little water it was made into tortillas. It is not eaten now (pl. 3, b).

Jicama (kamoli') (*Exogonium bracteatum* (Cav.) Choisy).—A long vine running up on trees and shrubs. It flowers in winter when leafless, making a showy display with bright reddish bracts enclosing the small tubular flowers. It has a large tuberous root, said to be as sweet as a yam. It is baked in hot ashes or eaten raw.

Laurel (*Litsea glaucescens* HBK.).—A low stiffly branched shrublet of the mountains in the pine elevations. The leaves are used as a tea and as a condiment for seasoning meats. Some purchased from a Warihio boy while in Carimechi were found excellent for flavoring pork, quite comparable in quality to that employed by us in the north.

Lechuguilla (sapari) (*Agave bovicornuta* Gentry).—This is one of the larger, broad-leaved agaves used for making the distilled liquor, "mescal." However, it is regarded as inferior to other species. Nearly all distilling is done by Mexicans at present, but the Warihio frequently drink mescal. As with other species, the pit-baked head is eaten. It is native to the Oak and Pine Forest belts.

Lechuguilla ceniza (totosali) (*Agave shrevei* Gentry).—This is a smaller species with light-gray leaves common to the more open rocky slopes of pine lands. It is reputed to be a sweet species for eating and employed in making mescal.

Mescal (*Agave yaquiana* Trelease).—The central stalk or head and the white basal part of the leaves are used to make batari, mescal, and "dulce." The flowering stalk when it is still young and tender is cut into sections and baked in the coals for eating, as is done with all species of *Agave* in the area. Likewise the flower buds are consumed after being boiled in ollas, like squash. This species is characteristic through the lowland forests on open rocky slopes and along rocky arroyos.

In addition to the vegetablelike character of the flowers and the flowering stalk of the several species of *Agave*, the pit-baked heads are an important source of sugar in the Warihio diet, as it has been for many of the Amerindians (cf. Castetter, Bell, and Grove, 1938). All of them used by the Warihio are prepared in the same manner. The baking pit, "maya," is dug into the ground and may be large or small. A large one is 5 or 6 feet in diameter by 4 or 5 feet in depth and lined with unmortared stones. It is provided with wood, some of which is green for making better coals, with a layer of stones on top of the wood. This is burned down and the agave heads, "cabezas," are laid upon the hot stones and coals and completely covered over with green palm leaves. Earth is put upon the leaves so that little or no heat or steam escapes. Thus the agave heads are pressure steam-cooked for about 2 days.

The pits I observed of the Indians were much smaller and unlined with stones and were used in conjunction with tuwuri. Doubtless some ceremony

attends the cooking of agaves for such occasions, but I failed to obtain notes.

When taken out of the "maya" the heads are ready to eat, the center pulp being a sweet nourishment with a molasses-like flavor. The leaf butts or bases are also sweet but are stringy with fiber. They are therefore chewed and sucked upon and the quids rejected. It is an important though irregular food of the Warihio and was probably more important in premaize times. If the stranger eats it in quantity, it acts upon him as a purgative.

From this cooked agave the Warihios brew "batari." The chopped pieces are put into large ollas of water, and as a catalyzer the root of a vine (nawo) (*Phaseolus caracalla* L.) is put in, which they say causes the water to "boil." After a day or so the bubbling stops and the batari is ripe for drinking. The older the brew becomes after this point, the weaker it grows and they speak of it depreciatively as "pasado." If plenty is drunk, inebriation ensues. The drink has a sour astringent flavor.

Eight or ten species of *Agave* grow in Warihio country throughout all elevations. Some are better flavored and sweeter than others. Among the most favored are "jaiboli" (temechí) of the Guajaráy country, "masahuari" near Jecopaco de las Flores, and "chahuiqui" (chawiki) of Sierra Guicorichi rocky summits. None of these three species have botanic names. The Mexicans of the region generally call agaves "mescales," but in many cases have adopted the Indian names for certain species or varieties. No instance of agave cultivation was noted among the Warihio. However, the Mayos frequently collect wild species and cultivate them near their houses. One such instance was observed in the village of Chijucu, near Navojao. A "lechuguilla ceniza" (*Agave* sp.), there was reported brought from the wild near Los Escolares above Tepahue by the Rio Cedros, because of its superior eating qualities. Another species native to Isla Lechuguilla, a sand-spit island off the northwest coast of Sinaloa, is reported to have been introduced to the mainland in recent times by the Mayo Indians.

Mostasa (wachelai) (*Dryopetalon runcinatum laxiflorum* Rollins).—A cruciferous winter herb maturing in early spring. The leaves are cooked as greens and the seeds mixed with water are taken for medicinal purposes. The seeds are also mixed with animal fat and applied as an unguent.

Orégano (mapá') (*Hedeoma floribunda* Standley; *Hedeoma patens* Jones; *Monarda austromontana* Epling).—These three plants belonging to the *Salvia* family are all used for seasoning foods under the Spanish name, orégano. Mapa' is the Warihio name for the two similar appearing species of *Hedeoma*, which they also decoct for treating stomach trouble. Another orégano (*Lippia palmeri*) in the *Verbenaceae* family grows upon the more arid mesas of the lowlands. It is used in the same way by the lowland people, and in the author's opinion is quite equal to or better than the orégano seasoning of northern kitchens.

Pochote (wacapi) (*Ceiba acuminata* (Wats.) Rose).—One of the kapok trees. Young plants form a large, elongate, spindle-shaped corm, soft, juicy, and white. It is baked in the coals and eaten. The dark-brown seeds have a nut-like flavor, ripen in winter, and are reported to be eaten. They are rich in oil.

Palma (ta'ku) (*Erythea aculeata* Brge.).—The soft white vascular tissue in the center of young growing palms is eaten anytime, either raw or roasted in the coals. The larger palm (*Sabal uresana*), which also grows in the region, is also so employed.

Quelite mahso (*Amaranthus palmeri* Watson).—This is a common pigweed of the summer, found along most any cleared or open land, and a pest in the milpas.

The young green leaves and tips are cooked as greens. Other related species, as well as several other herbs, may be used as pot herbs and generally are called "quelites."

Saiya (*saiya*) (*Amoreuxia palmatifida* Moc. and Sesse).—Low erect summer herb with a showy orange flower perennial from tuberous roots. The roots are eaten roasted or boiled, preferably roasted. The young tender green fruits are eaten raw and have a piquant, condimentlike, distinctive, and pleasant flavor. I have eaten them in salads with much satisfaction. At Comondu in Baja California the Saiya is still esteemed as a food by the Comondu people. The roots are employed in soup, or baked, or dried and ground into flour for tortillas. The young pods are eaten green and the seeds are employed as coffee. The plant merits introduction into northern gardens. Several species have been described from Sinaloa.

San Pual (*Tagetes jaliscana* Greenman).—Annual summer herb of the pine country brewed as a tea. Anisilla, *Tagetes filifolia* Lag., is also so employed. It has a licorice flavor.

Socoyol (*Oxalis albicans* HBK.).—A small, decumbent herb with bright yellow flowers common to the moist meadows of the mountaintops. The leaves are eaten as a relish or salad.

(Tai-é' choli) (*Agave* sp.).—This is one of the smallest of the Agaves, the rosette of leaves being not over 5 or 6 inches broad and resembling *Agave parviflora* Torr. The numerous leaves are filiferous, 2 to 3 inches long, and with white brushlike marks above. It is sometimes eaten because of its sweetness after pit-baking as with other species. The flowering stalk is narrow, straight, and light, and was reported by Emiliano and others as formerly used as the shaft for arrows.

Yerbanís (*Tagetes lucida* Cav.).—A composite herb of the meadows of the high pine country that makes a refreshing, aromatic tea. It has a wide use among the Mexicans, Tarahumare, and Warihio, and is occasionally found in the markets. It is also used as a medicine to relieve headaches and stomach-aches.

SEED FOODS

Aguaro, peritos (tancócohi') (*Martynia annua* L.).—This is a common wayside summer annual, which may form dense colonies up to 1 m. tall. The nutritious seeds with a high content of oil are eaten whole or ground into a paste. The dry fruits are burned and the ashes rubbed over the limbs for paralysis or "calambre." *M. fragrans* Lindl. is also used for the same purposes. The large tuberous roots of *M. altheaefolia* Benth. are reported to have been dug up in the dry season by the Mexican rancheros and fed to their cattle when pasture was scarce.

Algarroba (yepówicha) (*Acacia pennatula* (Sch. and Cham.) Benth.).—The seeds (or seed pods?) are reported eaten formerly and still are in times of famine. Winter. They were roasted and ground on the metate.

Algodon (*Gossypium* sp.).—The seeds of cultivated or escaped plants are reported to have been eaten (see p. 87).

Biznaga (teiwe') (*Ferocactus* spp.).—The raw seeds are eaten whole or ground and eaten as "pinole," "atole," or for making tortillas. One species is a common cactus throughout the Rio Mayo hills of lower elevations and produces an abundance of seed in late summer. Another is *Ferocactus alamosanus* Brit. and Rose, which grows upon the rock cliffs in the pine and oak forests of the higher mountains.

Chirowi, huinola (sinala) (*Acacia cymbispina* Sprague and Riley).—One of the most abundant trees of the Thorn Forest of the lower elevations. The seeds are roasted, ground, and eaten in the form of atole, that is, as a gruel with water or milk, or the seeds are ground and made into tortillas. From Alamos south through Sinaloa this tree is known as "huinolo" or "huinola." The Mayo people around San Bernardo know it generally as "chirowi." The roots are decocted for stomach complaints.

Encino (hachuca) (*Quercus arizonica* Sargent).—The sweet acorns are eaten raw. The leeching and cooking culture employed by the Coahuila Indians of California and other northern tribes is apparently unknown to the Warihios. Another oak called "cusi," *Quercus albocincta* Trel., also has relatively sweet acorns which are eaten out of the hand. The acorn is known as "bellota."

Guasima (see also under Fruits). The seeds were employed as coffee.

Hecho (chiki) (*Pachycereus pecten-aboriginum* (Engelm.) B. and R.).—A giant cactus common to Thorn Forest and characteristic of the Short-tree Forest of the barrancas. The seeds are boiled to separate them from the pulp of the fruit, ground and boiled again, to produce a thick, nourishing, oily paste. The pulp of the inner rind is cooked into a jelly or jam known as "miel de hecho." The bristles, together with the pericarp, are employed as combs or brushes for the hair, whence the botanic name.

Jeco (wasiki) (*Prunus zingii* Standley).—A large leafy tree of the canyons with a dry hard fruit, which falls upon ripening. The hard hulls are scraped or worked off and the remainder is ground up on the metate and cooked into atole or ground and made into tortillas. May, June, and July. It is reported much used formerly and is still used to some extent.

Jojolino (*Crotalaria spp.*).—The seeds are ground and eaten as pinole. This name appears to be a corruption of "ajonjoli," the sesame of the Old World, *Sesamum indicum*.

Mauuta (ma'a') (*Lysiloma divaricatum* (Jacq.) McB.).—A dominant forest tree. The seeds are roasted, ground, and made into atole, which is any ground seed mixed with milk or water. Fall.

Mesquite (hupala') (*Prosopis juliflora* (Swartz) DC.).—The meat of the seed pods, known as "péchita," was prepared by boiling in water. It is reported to have a sweet taste. The water in which the "péchita" was cooked was drunk. The seeds after being roasted were ground and eaten as atole.

Palo colorado (welahi') (*Caesalpinia platyloba* Watson).—The seeds were roasted, ground, and eaten as atole. November and December.

Palo fierro (*Pithecellobium undulatum* (B. and R.) Gentry).—A low spreading tree similar in habit to mesquite. The seeds were roasted, ground, and eaten as atole, or ground and made into tortillas. Fall.

Tabachin (tapakachi) (*Caesalpinia pulcherrima* (L.) DC.).—Seeds are eaten raw when young and tender. The muleteers grab the pods hanging by the trail side, open the pods, and nibble the seeds as they walk. The seeds are as sweet and tender as peas after the seed coats have been removed. August and September.

Tepeguaje (machawi) (*Lysiloma watsoni* Rose).—The seeds are roasted, ground, and made into atole. Fall. It is a tree of hard, strong, durable wood, the bark of which is chewed for ailing teeth and gums and to tighten the teeth. Common to the barrancas and to the savanillas of the foothill valleys to the south.

Wacoporo (*Parkinsonia aculeata* L.).—Like tavachin the seeds are eaten raw when green and tender. Spring. It is one of the common Palo verde trees, thought to have been introduced from the Old World.

FRUITS

Arellane (chokey) (*Psidium sartorianum* (Berg.) Ndzu.).—A slender evergreen tree of the canyon bottoms bearing a small fruit, lemon yellow when ripe. It is eaten raw. The Mexicans make a sweet jam of it. The Warihios mash and mix the fruits with "panoche," the crude sugar of cane. Winter. The wood is employed for posts.

Bebelama (*Sassafridium macrophyllum* Rose).—Tree of the barranca canyons. The rather bitter fruit is eaten raw. Fall.

Chalate (wowuli) (*Ficus radulina* Watson).—This is the tallest of the wild figs and has the largest, best-flavored fruits. These are eaten fresh or dried. Burros and other animals are also fond of them. The tree grows along the barranca arroyos where ground water is always available.

Chapote (*Casimiroa edulis* Llave and Lex.).—A tall solitary tree of the more open canyon slopes bearing an edible fruit as large as a small apple, almost filled with three or four large hard seeds. The sweet granulate pulp is eaten fresh.

Chiltepín (kokoli) (*Capsicum baccatum* L.).—Small slender shrub with round red berries widely used as a red pepper seasoning; very hot but with an excellent flavor. They are also exported to the United States and can be found in the markets of Tucson and Los Angeles.

Choyitas (we' churi) (*Mammillaria* spp.).—The small crimson or red fruits are eaten raw. Birds and children are especially fond of them.

Chuna (chuna'), nacopuli (*Ficus cotinifolia* HBK.).—This is the most common wild Mexican fig, abundant along many of the arroyos in Thorn Forest and Short-tree Forest. The fruits are eaten fresh or dried although they have little to recommend them. *Ficus padifolia*, known as "chuna" or "nacopuli," has similar small fruits, but appears limited to the moister barranca canyons.

Guamuchil (makuchuni) (*Pithecellobium dulce* (Roxb.) Benth.).—A large tree spontaneous along the alluvial rocky margins of the river and the arroyos. The pulpy, rather acidulous aril surrounding the seeds is a favorite spring food of the Mexicans and Indians. Women and children journey along the streamways seeking the trees with sweeter pods and these trips in guamuchil season appear to give them pleasant times. As in pitaya season, which comes shortly after, they go equipped with baskets and long poles affixed with a hooking prong, thong-bound at the end. The children climb the trees securing the higher pods that cannot be reached from the ground. What they do not eat on the spot, they carry home in baskets to dry in the sun. Children have been known to gorge and sicken themselves. Among the Mexicans, trees on private property, although not planted, are regarded as owned and may be allocated to pickers on terms by the owner.

Guasima (ahiya') (*Guazuma ulmifolia* Lam.).—A spreading leafy tree common along the arroyos of the Thorn Forest and Short-tree Forest canyons. The young fruit is eaten raw when in the formative stage. The mature seeds with the fruit are ground for making tortillas, atole, and pinole. The seeds after separating from the fruit are also employed as coffee. The soft, pliant, white wood is much used in making chairs, handles, balls for the kicking race game, and general construction. Altogether it is one of the most useful trees.

Gumbro, bainora (susutu) (*Celtis iguanea* (Jacq.) Sarg.).—The orange ripe berries are casually eaten. November through winter. They are also much eaten by foxes and birds.

Jeco (wasiki) (*Prunus capuli* Cav.; *Prunus gentryi* Standley).—These are small trees growing along arroyos and meadow margins in the higher mountains. The fruits are eaten fresh or dried. The wood is used for tool handles.

(Mahóy piwála) (*Matelea tristiflora* (Standl.) Woodson).—Summer vine of the milkweed family growing in the shade of the Short-tree Forest. The young tender fruits are eaten raw or roasted. Late summer or fall.

Manzanilla (*Arctostaphylos pungens* HBK.).—The berries are eaten fresh or dried by Warihio and Tarahumare.

Melon de coyote (ha'lu) (*Cucumis anguria* L.).—This is a small ground vine infrequent in the Rio Mayo country. The young fruits are eaten by the Warihio. The selyeme of the Guasaremas area also recommended the roots decocted as a remedy for stomach and bowel ailments. The plant has a very wide scattered distribution, being found in both the Old and New Worlds. In North America it has been reported or collected from a few distant localities on both Atlantic and Pacific coasts. It may have been introduced by early Amerindians.

Papache (hosocola) (*Randia echinocarpa* Moc. and Sesse).—This is a sprawling shrub with thick stiff branches common along arroyos and valleys in lower elevations. The grotesque excrecentious fruits are gathered as they begin to ripen in early winter and are brought into the house. If left to ripen on the shrubs the birds and mammals soon despoil them. When ripe the hard pericarp is filled within by a black puddinglike sweet mass with numerous seeds. The black pulp is eaten raw and children of both Mexicans and Warihios are very fond of it.

Papache borracho (*Randia obcordata* Watson).—A slender thorny shrub with stiff spur branchlets common in the Thorn Forest. The small fruits, an inch or so in diameter, have a pulp similar to the larger-fruited papache and are occasionally eaten by children. However, it is reported to make them bilious and sick, whence the name "borracho," meaning drunk.

Pitaya dulce (meweri, mewe) (*Lemaireocereus thurberi* (Engelm.) B. and R.).—This is the Organ Pipe cactus so dear to the palate of the Sonoran Indians and Mexican rancheros. Of all the wild fruits this is undoubtedly the best flavored and most refreshing. It ripens in late May and June during the hottest weather; hence the gatherers rise in the very early morning and vie with one another for the choicest trees and fruits. Long hooking poles of oate (*Arundinaria longifolia*) are carried for reaching the fruits which are knocked to the ground. What are not eaten on the spot are carried home in baskets, to be eaten later, or dried, or cooked into jam. When ripe the fruits are usually bright or purplish red and the areoles of spines are easily knocked off with a bit of brush. A yellow-fruited variety has also been reported.

Pitaya barbona (matagachi) (*Cephalocereus alensis* (Weber) B. and R.).—This is a smaller type of tree cactus than pitaya, with smaller fruits ripening later in July and August. It occurs in the Short-tree Forest on rocky slopes and although eaten by the Warihios and Mexicans is not so sought after. The term "barbon" comes from the white beard which grows on the fruiting branches.

Sapuche (*Randia laevigata* Standley).—A small, localized, irregularly spreading tree or shrub along the lower borders of the Oak Forest. It bears a pear-shaped fruit, ripening in November. The Warihios gather them as they do papache and eat them raw. A related species, Sapuche de la Sierra (*Randia*

mollifolia Standley), has a similarly shaped edible fruit, but is even more localized. It was first found about some caves on Sierra Saguaribo above Ocurahue, which had been inhabited in times past.

Sahuiliqui, datil (sawiliki) (*Yucca grandiflora* Gentry).—This is a tree Yucca with large fleshy fruits. This species and related ones occur in scattered colonies on rocky slopes of middle and higher altitudes of Sonora and Chihuahua. The large ripe fruits are a prime source of sugar through the hinterland for both the Warihio and the Mexican rancheros and the flower petals are cooked like fresh squash. The sweet fruits are eaten raw or roasted, but the seeds are rejected by the rancheros. The Warihios report that the young tender fruits may also be eaten raw or roasted and the seeds ground and eaten. However, the seeds are known to contain high percentages of bitter sapogenins, so if the Warihios consumed them, it may have been a famine food. The seeds of the related *Yucca arizonica* McKelvey contain up to 30 percent of oil and more than 10 percent of protein and are doubtless nutritious. Yucca flowers have been reported to be high in vitamins.

Talayote (pasagi) (*Vincetoxicum caudatum* (Gray) Standley).—Low, decumbent, perennial, milky herb. The young fruits are eaten raw or roasted.

Tempisque (*Sideroxylon angustifolium* Standley).—Tree of the foothill arroyos and valleys. Fruit eaten raw. The Mexicans make a sweet jam from the fruit. July.

Tescalama (wehtoli) (*Ficus petiolaris* HBK).—Large tree scattered upon cliffs. The bright yellowish trunk and white roots roping down rocks and cliffs make it a conspicuous cliffdweller. The fruits are eaten fresh or dried, but are of poor quality.

Tomatillo (pasagi) (*Saraca jaltomata* Schlecht).—A low, heavy, herbaceous bush in moist soils of the higher elevations. The fruits are reported eaten. Summer.

Tonchi (*Marsdenia edulis* Watson).—A large leafy vine of the Short-tree Forest. The young tender fruits are eaten raw. Summer.

Tuna (tuná') (*Opuntia* spp.).—Prickly pear. Only the *Platyopuntia* species were reported as edible. Several wild species are acceptable and a few orchards of domesticated varieties are found in the mountain highlands, as at Canelo. The fruit is collected, peeled, boiled in large ollas, then ground, seeds and all, on the metate and eaten. It is also eaten raw. Summer.

Uvalama (huhuwalli) (*Vitex mollis* HBK).—Tree of the canyons and foothill valleys, especially in the savanillas. The fruit is eaten raw or mashed up with sugar. Summer. It is rather bitter. Occasionally one sees the fruits for sale in the lower markets.

CONSTRUCTION AND FUEL

Amapa amarillo (*Tabebuia chrysantha* (Jacq.) Nichols).—Forest tree with a massive bright-yellow bloom in the fall. The wood is valued highly for beams, cabinetwork, and construction. Another species, "amapa colorada" (*Tabebuia palmeri* Rose), distinguished by its pink to red flowers, is much more common and the wood is equally valued. They are very enduring, strong, hard, and are attacked by few insects.

Algodoncillo, papelio (*Wimmeria mexicana* (DC.) Lundell).—A slender tree found on rocky hilltops; employed for posts and general construction.

Batamote (*Baccharis glutinosa* Pers.).—The common riparian bush along arroyos. It is employed in making roofs of brush, as on "ramadas."

Batayaqui (talaka'o) (*Montanoa rosei* Rob and Greenm.; *Montanoa patens* Gray).—These two tall composite shrubs of the barrancas are very similar in appearance but *Montanoa rosei* occupies the lowland canyons and flowers in the spring, while *Montanoa patens* grows in the higher elevations, even occurring with the pines and flowers in the late summer and fall. In both the white bloom is profuse and odorous. They are used by the Warihios in making crates, "guacales," granaries, fences around houses or gardens, in the sides of mud-wattle houses, as well as to support underlying grass in earthen roofs, a function they share with several other shrubs having long straight branches. Formerly they were employed as the points for arrows, poisonous properties being attributed to them; whence the name "batayaqui" or "mata yaqui", meaning Yaqui killer. The leaves are still used medicinally as poultices for bruises, sores, and aches when coated with animal fat or grease, or better with some patent ointment when available.

Brasil (huchachago) (*Haematoxylon brasiletto* Karst.).—A small tree or shrub with a deeply fissured trunk. It is used for uprights, for the sides of mud-wattle houses, and for posts in corrals. From the deep-red heartwood little rosary crosses are carved and a light red dye is obtained by boiling it in water. The wood is excellent for fuel and will burn green; it is widely employed throughout the lowlands of Mexico.

Carrizo (*Arundo donax* L.).—This giant reed of the Old World is so widely dispersed along the creeks, rivers, and settlements of the warm lands of Latin America it appears as if a native. Could it be an early Amerindian introduction? It is used by the Warihios for making pens for fowl and pets, for storage bins in houses, etc.

Kowusamo (kowusamo) (*Coursetia glandulosa* Gray).—Large shrub with tough springy branches which were used by the Warihios for bows. It is also used for fuel and construction.

Chilicote (*Erythrina flabelliformis* Kearney).—Small tree of the rocky barranca slopes with very soft white wood employed for gourd and bottle stoppers.

Chirowi, huinola, huinora (sinala) (*Acacia cymbisipina* Sprague and Riley).—It has an abundant use as fuel along the west coast of Mexico. In Sinaloa it is extensively employed in making charcoal. See also under Seed Foods.

Chopo (cho'po) (*Mimosa palmeri* Rose).—A small Thorn Forest tree used for construction and fuel.

Encino, roble, Encino blanco (kusi, hachuka, sahawo) (*Quercus* spp.).—There are 8 or 10 species of oaks in Warihio land which have a limited use for building and a more general use as fuel.

Guiloche (*Disphysa occidentalis* Rose).—A small spreading Thorn Forest tree with yellow flowers and tough pliant wood. At San Bernardo it was reported to have been used in earlier days as a battle club. Used for fuel and posts.

Güirote de Culebra (*Serjania mexicana* Willd.).—A large vine climbing high upon trees. The tough stems are often employed by the forest peoples, whether Indian or Mexican, as cordage for binding up such gatherings as wood, grass, poles, or herbs to carry home. *Serjania palmeri* and *Gouania mexicana*, similar tough vines, are also employed as rough cordage.

Guasima (ahiya) (*Guazuma ulmifolia* Lam.).—Employed in construction and furniture; see under "Fruits."

Mauta (sahí') (*Lysiloma divaricatum* (Jacq.) MacB.).—A dominant forest tree. The wood is regularly employed in the construction of buildings, corrals, and as fuel.

Mesquite (hupala) (*Prosopis juliflora* (Swartz) DC.).—Used for fuel and in construction. See also under "Seed Foods."

Nesco (*Willardia mexicana* (Wats.) Rose).—A small tree with a light gray trunk, flowering leafless in the dry season. Used in construction. Reported to poison honey.

Otate (pakwi, pakuwe') (*Arundinaria longifolia* Fourn.).—The bamboo of the Rio Mayo country, growing in the moist shady canyons of the barrancas. Estrella Canyon in the Cedros range appears to be about its northern limit. The poles are employed for building roofs, granaries, corrals, fishing, and fruit-gathering, etc. Barranca dwellers cut and carry them to the lowlands, selling them by the piece.

Palo blanco (*Piscidia mollis* Rose).—It is a sturdy white-barked tree, oaklike in habit, scattered through the foothill valleys in sandy alluvium. It is used for fuel and posts. Reported also to be used in poisoning fish.

Palo chino (*Pithecellobium mexicanum* Rose).—A mesquite-like tree of the alluvial bottomlands. It is used in construction, for musical instruments, and as fuel.

Palo chino (*Pithecellobium mexicanum* Rose).—A mesquite-like tree of the lowlands used for posts, for general construction, and as fuel.

Palo de asta (*Cordia sonorae* Rose).—A slender tree flowering white in the spring dry season. The wood is used in construction and for tool handles.

Palo duce (*Eysenhardtia polystachya* (Ort.) Sarg.).—Small shrubby treelet with light checkered bark and hard durable wood employed in building, tool handles, cane mills, etc. An infusion is made of the wood and drunk for stomach trouble and other afflictions; it forms a dark reddish brew, which floresces brightly under ultra-violet light.

Palo joso (*Albizia sinaloensis* Brit. and Rose).—A rather large tree infrequent in the lower valley where ground water is available. The long trunks are used for beams, posts, and other constructions.

Palma (ta' cu) (*Sabal uresana* Trelease).—The largest native palm of the Rio Mayo foothills. The leaves are employed for thatching roofs. The Warihios also collect the terminal leaf buds and strip out the young tender segments for making baskets, while the mature leaf is employed in "petates," the plaited mats. Sections of the trunk also serve for posts, uprights, and beams. A smaller species of palm, probably *Erythea aculeata* Brge., is also employed for baskets and petates, while the leaves are considered superior to those of *Sabal uresana* for roofing. See also under "Root and Herbage Foods."

Pino (heko) (*Pinus* spp.).—The wood is employed by the Warihios in making their musical instruments, the violin and the harp. Pitch slabs are used for torches and lighting houses in the barrancas and are known by the Mexican name of "ocote." The resins are employed medicinally for breaks and bruises, catarrh, and other afflictions. The wood is used generally in construction, for shakes, furniture, etc. *Pinus ayacahuite* Ehrenb., *P. arizonica* Engelm., and *P. oocarpa* Schiede are common species.

Sabino, cedro (hawoli) (*Taxodium mucronatum* Ten.).—Fine groves of these trees occur in the canyons east of the Cedros River and more scattered ones in higher affluents of the Rio Mayo. Large bowls and spoons are made from the wood.

Sacate.—Sacate is the common name for grass in Mexico. The larger coarse species are used as a lay-bed for earthen roofs. *Muhlenbergia gracilis* and others are used for packing the "aparejos," the Mexican pack saddle.

Sauce (*Salix bonplandiana* HBK.).—Used for posts and furniture.

Tepeguaje (machawi') (*Lysiloma watsoni* Rose).—Large spreading tree of the barrancas. The very strong heavy wood is used in construction. The Mexicans employ it for making gears and rollers in sugar mills. The bark is used in tanning skins, chewed to harden the gums and strengthen the teeth, or decocted as a potion for fevers.

Vara blanca (*Croton alamosanus* Rose).—An abundant, slender, closely branched shrub employed as a first layer covering over beams in earthen roofs. Over them is laid grass and finally clay soil. It is also used in fences. The roots are mashed up and cooked in water, making a very bitter potion for indigestion and stomach troubles, "empache del estomago."

Vara prieta (*Brongniartia alamosana* Rydb.).—A closely colonial Thorn Forest treelet or shrub commonly used through the Warihio area for fuel and construction, especially in mud-wattle construction.

MEDICINAL AND MISCELLANEOUS USES

Aguaro, peritos, see under "Seed Foods."

Amole (hauwe') (*Agave vilmoriniana* Berger).—A limber-leaved, unarmed, cliff-dwelling Agave employed in washing clothes. The dry fibrous butt ends of leaves cut from plants that have flowered and died are rubbed directly upon the clothing, the sapogenin making a soapy spume with the rubbing. The leaf bases are usually beaten with a rock to free more of the sapogenin and lengthen the bristles. It functions as a readymade, self-soaping brush.

Anisillo (*Tagetes filifolia* Lag.).—A delicate, aromatic, colonial, summer annual common in the pine meadows of the mountains. A licoricelike tea is made from the dried herbage as a refreshing drink and to relieve minor indispositions.

Añil (*Indigofera suffruticosa* Mill.).—Emiliano reported that the Warihio formerly employed the herbage for making a dark dye for woolen fabrics.

Ariosa (wachomo') (*Viguiera montana* Rose).—A harsh-leaved, perennial, composite herb of the oak belt. Emiliano reported that the Warihio women bind the leaves on the stomach to facilitate menstruation and to induce labor pains.

Bacatón (talakao) (*Lippia pringlei* Briq.).—Licha Acuña reported this shrub or small tree as being particularly efficacious in treating many different ailments. The sap is used for toothache. The leaves after being steeped in hot water are coated with mentholatum, grease, or other ointment and applied to bruises, headaches, etc.

Baiboria (nachachicoli) (*Elytraria squamosa* (Jacq.) Lindau).—A common, xerophytic, perennial herb of the Thorn Forest. The herbage is decocted or infused for fevers.

Barboria (*Dorstenia drakeana* L.).—A small herb of the shady barranca forests with tuberous roots, which are decocted for treating fevers. They may be found in the markets of the lowland towns.

Beraco, veraco (peychi) (*Stemmadenia palmeri* Rose and Standley).—A treelet or shrub with heavy green foliage common along the arroyos and canyon bottoms. The Warihios report it as efficacious in treating sore eyes, the latex being inserted in the eye from the dripping cut stem. It is also applied for other afflictions.

Brasil (huchachago), see under "Construction and Fuel."

Buli (wuli) (*Lagenaria siceraria* (Mol.) Standley).—The cultivated gourd vine, the hard shell of which is widely used in Mexico as a dish, water container, and dipper. Nearly every "rancheria" in Sonora has one of these hung or placed near the family drinking ollas, frequently floating in it. The Warihio,

Mayo, and Yaqui Indians also employ them as gourd rattles in their dancing ceremonies.

Cacachila (himoli) (*Karwinskia humboldtiana* (Zucc.) R. and S.).—This is an abundant shrub, usually holding leaf longer into the winter dry season than many other plants. The leaves are put on the forehead to relieve headaches, preferably with some aromatic salve. The fruits are sometimes eaten by small children and are reported to make them weak and produce trembling. The author has observed "cholugos" (*Nasua narica*), eating the fruits with gusto. The seeds are known to contain a dangerous toxin.

Cachana (*Helianthella madreensis* Watson).—Composite herb of the high pine mountains. The roots are used in treating rheumatism and other similar ailments.

Chanate pusi (*Rhynchosia pyramidalis* (Lam.) Urban).—A leguminous vine with bright lacquer-like seeds, half red and half black, which ripen through the fall and winter, and from which the plant takes its Mayo name; "chanate" meaning bird, and "pusi," eye. The Mayos are reported to have used the seeds in necklaces and they are also regarded as having medicinal properties. The seeds are ground and mixed with an oil or grease and applied as an ointment to sores, bruises, headaches, and similar troubles. I have no definite note that this plant was or is employed by the Warihios, but it is common through their environment. It is found in the subtropics and tropics of both Asia and the New World.

Cardo (tachiná') (*Argemone ochroleuca* Sweet).—A white-flowered poppy common in fallow fields and about milpas. In San Bernardo it was reported that the juice of the plant as it exudes is applied to sore eyes.

Chirowi, see under "Seed Foods."

Chopo, palo chopo (cho'po) (*Mimosa palmeri* Rose).—A small thorny Thorn Forest tree common in the foothill valleys. Emiliano reported that its bark was chewed to harden the gums and for ailing teeth. It is also used for construction and fuel.

Cocolmea (*Eupatorium quadrangulare* DC.).—A tall, shade-loving, composite herb of the canyons reputed to have curative properties. The stems are quadrate.

Cominillo (*Pectis stenophylla* Gray).—A low, aromatic, perennial herb on coarse rocky soils. The natives of San Bernardo make an infusion of the herbage and inhale the hot vapor in treating colds.

Confituria (*Lantana horrida* HBK.).—A spreading bushy shrub with orange-red flowers, rather common through the barrancas. A decoction of the herbage is made as a wash for insect stings and snake bites; small doses may also be taken orally.

Confituria blanca (*Lantana velutina* Mart. and Gal.).—A low, thin, spreading shrub with white flowers, through winter and spring. It is abundant through the Short-tree Forest. Like the preceding species it is used for snake bites and stings. Other confites employed in the same way are: Confituria amarillo (*Lantana glandulosissima* Hayek); confituria grande (*Lagascea decipiens* Hemsl. a composite); and confituria negra (*Tournefortia hartwegiana* Steud.), in the Borage family.

Copal, see "Torote."

Copalquin (hutetiyo) (*Hintonia latiflora* (Moc. and Sesse) Bull.).—A slender tree of the barrancas, flowering showily in summer. The tree is highly regarded as a specific cure for fevers and for its purgative properties. The bark is boiled in water and taken as a potion. As a purgative, it is boiled with salt and drunk before meals. No specific case of the Warihios using the

decoction was noted, but the tree and its attributed medical properties are certainly known to them and there is little doubt but that they so employ it. The tree is also used in construction and fences. A variety grows in the more arid lowland Thorn Forest and is similarly employed. Copalquin is widely known as a fever cure.

Corneton del monte (wahtauwi) (*Solanum verbascifolium* L.).—A large-leaved, spreading shrub common in the warm moist canyon bottoms of the barrancas. The leaves coated with grease or salve are laid on sores or applied to the forehead for headaches. The Mexican name is also applied to *Nicotiana glauca* Graham, and probably others.

Coronilla (*Berlandiera lyrata macrophylla* Gray).—Herb of the mountain meadows. It is much sought after by the herb gatherers who transport and peddle it to the herbalists in the lowland towns. It was also pointed out by the Warihio, Lusiano, who stated that it is used in treating stomach troubles, either as an infusion or decoction.

Ensangregrado (he'uho') (*Jatropha malacophylla* Standley).—So called in the vernacular from the pale pinkish or brownish juice which exudes when the stem or bark is cut. It is a smooth-limbed turgid shrub of the barrancas. As for torote papelio, the exudate is applied to cankers and other mouth sores, directly from the cut twig end. Being abundant, this medicine is almost always at hand. *Jatropha platanifolia* Standley (Gentry, 1942 a, p. 166) is a synonym of this species.

Escosionero (*Iostephane heterophylla* Hemsl.).—Composite summer herb of the mountains. The roots are valued for their medicinal properties and it is one of the plants handled by the drug trade in the lower towns. It is known to the Warihio, but informants could not supply me with any other name, which suggests it is not one of the original items in the Warihio pharmacopodia.

Escoveta, Arenilla (hipechila) (*Dalea diffusa* Moric.).—This species and *Dalea grayi* Vail, "popote," are slender wandlike shrublets frequently employed by both Warihios and Mexicans as brooms. Several of the long stems are lashed together to form a handle, while the terminal spread of diffuse branchlets constitutes the actual brush.

Estafiate, fiate (*Franseria acanthicarpa* (Hook.) Cov.).—Annual ambrosialike herb of the summers. It is highly regarded as an infusion or decoction in treating stomach troubles, colds, and other ailments.

Frijol cimarron (nowa') (*Phaseolus caracalla* L.).—A large bean vine with lavender flowers in late summer and fall, commonly found climbing over shrubs and upon trees. The Warihios use the enlarged roots as a catalyzer in preparing their fermented drink, batari (see text, p. 91). Another bean vine with somewhat coarser stems and procumbent upon the ground (*Phaseolus metcalfei* (W. and S.)), is also reported used in the same way. It is quite common over median elevations of Sierra Canelo.

Golondrina (*Euphorbia adenoptera* Benth.).—The herbage is decocted in water and used as a wash for bites and stings and also for sores. This is a small prostrate spurge, scarcely separable by the layman from other species in the same area, as *Euphorbia arizonica* Engelm., and *Euphorbia gracillima* S. Wats., which are employed in the same way. Medicinal properties are widely ascribed to the golondrinas in Mexico.

Gordolobo (*Heterotheca subaxillaris* (Lam.) B. and R.).—A common field-side weed in middle and higher elevations infused or decocted for curative practices.

(Hichiconi) (*Tillandsia inflata* Mez).—This is an attractive epiphyte growing upon oak limbs or rock cliffs. The cuplike axils of the leaves catch and hold rainwater for many days. The Warihios and others drink therefrom, where and when other water is not available.

Juve (*Bidens ferulaefolia* (Jacq.) DC.).—Composite herb of the high meadows with yellow rays. At Memelichi in the Sierra it was reported that the Tarahumaras make an orange-colored dye from the yellow flowers for coloring their weaving wools.

Quiqui (kiki) (*Laelia autumnalis* Lindl.).—A showy orchid growing on oak limbs and rocks in the mountains. The Warihios employ the mucilaginous sap of the pseudobulbs as a glue in making their musical instruments, principally the violin. It is applied directly by rubbing the skinned pseudobulb along the seam or wood surface to be jointed. There is also a belief, reported at Guarsaremos, that where "kiki" grows is no place to plant maize, for it will fail or do poorly.

Mantela de Maria (*Ipomoea pedicellaris* Benth.).—A large copious climbing vine with reddish-purple flowers, common in the lowlands. Summer. The seeds are taken as a purgative after being ground, roasted, and boiled in water.

Manzanilla del rio (*Gnaphalium leptophyllum* D.C.; *Gnaphalium leucophyllum* Gray).—These and other closely related species of *Gnaphalium*, tribe Inulae of the Compositae, are either infused or decocted as a potion for indigestion, for ailing children, and for adults afflicted with "empache."

Mata gusano (pipichowa) (*Perezia thurberi* Gray).—A coarse perennial herb with prickly leaves widely scattered in the Oak Forest belt. The enlarged roots are infused or decocted for various genital afflictions: to facilitate menstrual flow, for women ailing across the back over kidneys, for a man with a bad penis, and as a laxative (Emiliano report). A well-known herb in local pharmacies.

Matayaqui, see Batayaqui under "Construction and Fuel," pp. 96-99.

Matarique (*Cacalia decomposita* Gray).—An ugly summer herb with long scapose stems about 1 meter tall, native to the high Sierra Madre. The tuberous roots are highly valued for their medicinal properties by Warihios and others, and are collected and transported to the herbal markets.

Melon de coyote (ha'lu), see under "Fruits."

Ocotillo (*Parthenium stramonium* Greene).—Shrub of the barranca slopes. The heartwood is decocted in water as a remedy for various illnesses. One or two large spoonfuls are administered internally, while the rest is applied externally as a lotion. Whether this use originated with Warihio or Mexican is not known; it is employed by both.

Palma de la virgen, Palmita (*Dion purpusii* Rose?).—A low cycad rarely found growing in the moist shady canyons, as near Conejos and Guirocoba. The Mexicans report the seeds to have a medicinal value in treating sore eyes. After being finely ground, a paste is made and inserted in the eye.

Pamita (*Descurainia halictorum* (Ckl.) O. E. Schulz).—A small cruciferous winter annual. The leaves are eaten as greens, while the seeds are valued for their medicinal properties. At San Bernardo they are mixed with sugar and water and drunk as a hepatic remedy. Carlota Arguelles reported that formerly they were collected by the natives of San Bernardo to sell to the druggists in Alamos and Navojoa.

Palo dulce, see under "Construction and Fuel."

Palo mulato (*Bursera grandifolia* (Schl.) Engl.).—The pale greenish bark of this common tree is decocted and drunk as a remedy for fevers, especially

malaria. It is widely renowned among the native peoples of Mexico as a fever remedy.

Pioniya (*Zexmenia podocephala* Gray).—A highland, composite, perennial herb with tuberous roots, which are highly valued for their medicinal properties and are traded in the drug business of western Mexico. The barranca folk decoct them for stomach ailments.

(Picachalf) (*Euphorbia cuphosperma* Boiss.).—A leafy erect summer herb with red floral bracts. The Warihios report the milky juice as a remedy for sore eyes; the raw milky sap dripping from the cut stem is dropped into the eye. They do not distinguish between this and the similar appearing, *Euphorbia heterophylla* L., which they also call picachili.

Pipichowa, see Mata gusano.

Poleo (*Mentha canadensis* L.).—This aquatic herb grows only in the high mountains above the Warihio settlements, but is probably known to and used by them. The Mexicans of the region report that it is either infused or decocted as a cure for ailing kidneys, sleeplessness, or just to be taken as a refreshing drink. This may be the species to which Zingg refers in his list of Tarahumare plants, Bennett and Zingg, 1935, p. 144.

Popote, see Escoveta.

Rastrillo (tahewali) (*Maurandia flaviflora* Jtn.).—A leafy, suffrutescent, pendulant herb on cliffs. Emiliano reported that the leaves are rubbed on the skin to cure sores and pimples.

Saca manteca (palowisi, pusira) (*Solanum amazonium* Ker.).—The Mexican ranchers use the fruits for curdling milk to make cheese, whence the name, "to draw out fat." It may be similarly employed by the Warihio.

San Juanico (*Jacquinia pungens* Gray).—The green fruits are used for washing clothes and the hair. However, it is necessary to keep the eyes well closed when washing the hair since the juice is harmful to the eyes. The cleansing property is a sapogenin. The seeds are also employed as medicine, a paste being made into a ball and inserted in the nose to cure catarrh. It is a small tree with dense foliage, the leaves pungently tipped. It flowers abundantly in the spring. The bright orange-colored corollas are easily detached from the calyx, but are tough and endure for many days; are strung into necklaces and worn as garlands. A similar use of them has been observed among the Seri Indians and perhaps it was so used by other Sonoran tribes.

Siendre (heste') (*Porophyllum gracile* Benth.).—Suffrutescent slender herb of the more arid lowlands. When crushed the herbage has a pleasant pungent odor and Emiliano reported it to be infused and used in treating colds or catarrh.

Sitavaro, palo verde (*Vallesia glabra* Cav.).—Slender evergreen shrub along alluvial terraces and moist saline bottomlands. The juicy pulp of the small opalescent fruits is inserted in the eyes as a remedy for pink eye and other eye diseases. The foliage and branches are burned and the ashes rubbed on itches and measles pox.

(Soco') (*Yucca* sp.).—A small relatively inconspicuous *Yucca* with a sessile rosette of pliant thin leaves from a thick root crown or rhizome containing a viscous white fecula. This is employed by the Warihios and other barrancan people for washing clothes and hair. It grows in the higher elevations with pine and oak, and was never observed in flower or fruit, which is necessary for positive identification. It is an unknown species in literature. It may also be referred to as "amole," a term widely used in Mexico for saporific plants used as soap.

Tabachin (talpakachi) (*Caesalpinia pulcherrima* (L.) DC.).—Emiliano reported the roots boiled in water for treating insect stings and snake bites. See also under "Seed Foods."

Toji (tohi) (*Struthanthus haenkeanus* (Presl.) Standley).—A mistletoe found growing on palo blanco, (*Piscidia mollis* Rose). Emiliano reported that a decoction of the herbage is made and used as a wash for insect bites and stings.

Toloachi (tecuyawi) (*Datura wrightii* Regel).—The leaves are smeared with animal fat or some other available salve and applied as poultices to aches, bruises, and sores. It is a wayside perennial herb partial to sandy soils.

Torote copal, torote prieto (toro') (*Bursera penicillata* (DC.) Engler).—One of the large copal trees codominant through the Short-tree Forest. The herbage and bark is employed for treating catarrh and other afflictions. The aromatic gum is used for toothaches. The gum is also used by a mason wasp in building its nest. These nests are collected by the Warihios and used as incense in their ceremonies (see p. 128).

Torote papelio (wa'pe') (*Jatropha cordata* (Ort.) Muell. Arg.).—Like the *Bursera*, this euphorbiaceous shrub has a smooth bark which exfoliates paper thin. The juice of a cut stem exudes freely and is used as a wash for clearing the eyes or for curing eye diseases. Also, the exudate from cut stem may be applied directly to mouth sores. It is one of the most abundant shrubs or treelets of the lower elevations. It was mistakenly reported as San Miguelito (Gentry, 1942 a).

Torote prieto, torote jolopete (*Bursera fragiles* Watson).—The aromatic gum is used as a poultice for backaches, bruises, and bone breaks.

Uruquenía (*Croton ciliato-glandulosa* Ort.).—A low shrub with stipitate glands injurious to the eyes. Emiliano reported that the Warihio formerly mashed and boiled the herbage to make a black dye for their wool blankets and other woven articles.

Vara blanca (*Croton alamosanus* Rose).—A common, strictly branched shrub with whitish bark. The roots are mashed and cooked in water as a potion for indigestion and stomach troubles, "empache del estomago"; said to be very bitter. See also under "Construction and Fuel," pp. 96-99.

Vinorama (kuka') (*Acacia farnesiana* (L.) Willd.).—The Warihio pulverize and mix the fragrant flowers with grease, which they rub on bruises and foreheads to relieve headaches. The tree is also used for fuel and construction. In the Old World the flowers are employed in making perfumes.

(Wachomo') (*Zexmenia seemanni* Gray).—A harsh-leaved perennial herb of the Oak Forest belt. As with *ariosa*, the harsh leaves are bound on the abdomen by women to facilitate menses or induce labor in childbirth.

Yerba colorada (*Potentilla thurberi* Gray).—Perennial summer herb in the meadows of the Pine Forest zone. A decoction is made of the roots as a purgative for stomach or digestional ailments. Herb gatherers take it from the high mountains to sell to the druggists in such lowland towns as Navojoa, Ciudad Obregon, and Alamos. I have no note of it being used by the Warihios, though they are known to collect the plant, and doubtless also employ it medicinally.

Yerba del aigre (*Tritix wrightii* Rob. and Greenm.).—Perennial herb on the more arid rocky slopes in Oak Woodland, blooming in February and March. Emiliano reported that the flowers are mashed and applied to the forehead for headaches and for calming the insane. It has a wide reputation as a curative herb through northwestern Mexico, and doubtless other uses are made of it.

Yerba del Indio (*Aristolochia quercetorum* Standley).—Prostrate herb of the Oak Woodland. A decoction is made of the tuberous roots and drunk for

"empache," stomach ailments, and used as a wash for sores. The roots of several species of *Aristolochia* are widely used as remedies for varieties of ailments in northern Mexico, the name, Yerba del Indio, being generally applied to them.

Yerba de flecha (*Sapium appendiculatum* (M. A.) Pax and Hoffm.).—The bark of this tree is employed by the Indians to stupefy fish for collecting. It was also used formerly to poison the tips of arrows, whence the name. Similar uses and properties have been reported by the natives for *Sebastiana pringlei* Wats., known as Brincador, source of the "jumping beans" in the curio trade.

Yerba del pasmo, batamote del monte (*Baccharis thesioides* HBK.).—Bushy shrub resembling *Baccharis alamosana* Blake, but larger and more widely distributed in western Mexico. Both are infused or decocted and taken internally for digestive afflictions and for cancer, "pasma."

USE OF ANIMALS

DOMESTIC ANIMALS

Beef is eaten fresh or dried. The fresh meat is broiled over coals and eaten out of hand. A stew or soup made up of bones and meat ends is boiled in large ollas placed over fires. Most of the animal is cut into strips and dried hanging in the sun, to be cooked over the coals and eaten later. It is not a regular item in their diet. He who has more than six or seven cows is regarded as a rich man.

Goats, and less often sheep, are generally slaughtered for serving in the ceremonial *tuwuris*. Most of the animal, including the visceral fat, is stewed in large ollas and served in small earthen bowls. It goes by the general term "wacavaki," probably Mayo, but is called "wepasuni" by the Warihio. The blood is also used. The food is eaten with the hands or sucked out over the edge of the bowl, and if the party is large, two or more may work upon the same bowl. Meat is torn between the teeth and hands into strips convenient to the mouth for chewing.

The pig furnishes meat for boiling, for "tamales de coche," and lard or "manteca." It is the universal cooking oil of northern Mexico and the Indians sell it to their Mexican neighbors.

Chickens are sometimes kept and their meat and eggs eaten.

Sheep are infrequently kept for their wool.

Dogs live regularly with the Warihio. Generally they are poor and mangy starvelings, living on what little bits of scraps are thrown them, on refuse, and on human excrement. This latter, though its nourishing content must be very low, is their most regular supply. When the Indian eats, the dog will eat in his turn. Excrement eating is a common habit of dogs all over Mexico. They, with pigs and chickens, are the sanitary departments in the small pueblos.

Among the Warihio a small houndlike, short-haired, blue-gray breed is common. They are tendered only the most fleeting and fickle

affection. Children unwittingly mistreat them in play. Due to all this abuse the poor dogs live with a sour, unresponsive temperament, and because of their proneness to bite are dangerous to have around. The relationship suggests that of symbiosis, which, as the beginning of dog domestication, we think of as long past.

A relevant note in Carimechi:

Leecha and Esteban have a dog which they treat rudely. When visitors arrive they immediately drive him away from the house with sticks and stones, because, they say he is "muy bravo." He lives most of the time skulking about the bushes growing round about their house and reminds one of what the incipient stages of early dog domestication were probably like. The dog is not loved, hardly befriended, but obviously tolerated.

WILD ANIMALS AND METHODS OF CAPTURE

Of wildlife, the meat of fish and deer is eaten most often. The minnows are laid upon rocks in the sun to dry and are eaten whole a few hours or a few days later. The larger species are gutted, a "tuna" (prickly pear cactus, *Opuntia* sp.) pad, peeled, is inserted in the ventral slit, and baked in the coals. To residents along the good fishing streams, the Guajaráy and the Rio Mayo itself, fish is a more common food than to those elsewhere, and an important part of their menu. Fish are taken by the modern steel hook, by poisoning, by "baskets," and by diverting small streams. Of the first nothing further will be said, since it is self-explanatory and not indigenous. Of poisons four vegetative sources have been reported. The shrub or small tree, known widely under the Mexican name of "yerba de la flecha" (*Sapium appendiculatum*), is probably the most potent and has been figured in accounts since early conquest days (Beals 1932 b, p. 115). The second is a perennial herb or shrub, known locally as uruquenía (*Croton ciliato-emarginata*). Then there also grows a tree known as brincadores (*Sebastiania pringlei*), thus named because its seeds in season are made to jump about over the ground by a larval insect within, and known in this country as the jumping bean. The method of use in all three is the same; foliage and branches or the bark are beaten up and put in pools during periods of little water flow—fall and spring. All three plants are members of the Euphorbia family, many members of which are known the world over for their toxic compounds. Palo blanco (*Piscidia mollis* Rose), is also reported to have fish poisoning properties. By "baskets" is probably meant the large carrying frames, "colotes" (wakahali W.). No special nets or anything like nets were observed. With the poisons the men enter as a unit into pools where many fish lie and, working together, scoop up many into their baskets. By damming or diverting

small streams, the water is drained or bailed out and the fish may be picked up as they flop about in the little pools or on the surface of the ground.

They claim to kill deer with the sling by hitting them in the head with a rock,³ and to capture them with a snare. The snare is fashioned by bending a stout pliable sapling and securing it by agave or palm twine with a loop and trigger arrangement upon ground where deer are known to run. It is so set that the implantation of the cervid foot will release the sapling and jerk the animal into the air, where it is held until the coming of the hunter. The venison is treated like beef. It is also served as "wepasuni" during tuwuri. The species of deer is *Odocoileus couesi*.

Javelinos, the wild peccaries (*Pecari angulatus sonorensis*), are taken by driving them into caves, to which the animals will run for refuge. Brush is then piled in the opening and set afire, suffocating the animals within. The hides are sold and the meat eaten. This capturing method has been reported for other parts of western Mexico. The Mexicans also employ it.

Occasionally a chachalaca, a pheasantlike bird (*Ortalis vetula vetula*), may be knocked over with a stone. Ducks and mergansers are said to be caught by men entering the water with a disguise over their heads and drifting with the current among the quarry as reported by Licha Acuña. Occasionally a quail nest is robbed of eggs; if so, eggs of other wild bird species are probably also taken. Grasshoppers are reported to have been eaten by families in Bavicora in times of hunger. Rattlesnakes are reported by Lusiano to be edible; head and tail are cut off and the central portion eviscerated and roasted. The fat of the cholugo (*Nasua narica*) is eagerly sought by some as a medicine for bruises, sores, cuts, and aching ailments; it is rubbed upon the afflicted part.

Honey of several species of bees is taken by fire and smoke from the high cliffs. Some of the Warihios have little fear of climbing, by means of rude ladders, upon the perilous faces of the cliffs to obtain the honey. They are regarded as experts, after the manner of men of trades, as they aboriginally are. Such men as Ramon Gascon of Sierra Garcia and Vicente Guireña of Tiruta can truly be called wild-honey gatherers. Honeycombs that cannot be reached otherwise are sometimes dislodged with thrown stones and fall within reach.

Animals in times past were, no doubt, taken with the bow and arrow, for living Warihio have memory of their use. Juan Campa remarked that a deer shot through the shoulder was immediately taken, but

³ Sling observed in Conejos.

if shot in the belly would run away and escape. One bow at least is still extant in Warihio possession in Loreto. (See "Myths," p. 134.)

Lusiano reported the bow made of a tree known as palo moro (*Morus* sp.), with draw string of rawhide, the arrow of the small stalk, entirely of *Agave* sp., and the point from the shrub batayaki (*Montanoa rosei*), because it was poisonous. In the lowland district of San Bernardo and Chorijoa the bow was about 1 meter long and made of the tree kowusamo (*Coursetia glandulosa*); the arrow shaft, of carrizo (*Arundo donax*), or better of taiyecholi (*Agave* sp.); the point was of brasil wood (*Haematoxylon brasiletto*), or better yet of batayaki (*Montanoa rosei*), because it was supposed to have poisonous properties. Emiliano reported that contests were held by shooting at a white cloth on a plank, accompanying the statement with the following monolog, which he freely translated upon request into Spanish:

Muhimani tosaname chewatane
Ka-i' chewaluni!
Seneche muhimane
Ba' chewaluni!

A ver si puede de el blanco!
No lo di!
Voy a dar otro.
Ahora, si le di te!

A free translation of Emiliano's vernacular Spanish would be in English: "Let see if the white can be hit. I didn't do it! I'll give it another. There, I did it!"

Since this was within his memory, the use of the bow hung on, at least as a playful survival, until very recent times. Also, Bartolo Hernandez recounted that he fought with allies of Indians from the vicinity of Macoyahui and Conicari during the revolution in 1914. In a pitched battle near Macoyahui the Indians used long bows, which they pulled with their feet and hands, sitting upon the ground with the bow horizontal.

DIVISION OF LABOR

The women cook; keep house; weave baskets, blankets, and petates; make pottery; carry water; gather wild fruits and seeds; and help their husbands in the milpas. They carry out the rather extensive process involved in making tortillas, from preparing the harvested seed on through the several steps of soaking, grinding, and cooking. They also prepare many other seeds in more or less this same way and in general appeared to be the regular cooks in Warihio families. They attend to the small children and teach the girls from early childhood to work. By the age of puberty they can make tortillas and carry out all essential daily chores envolved in living.

The men clear and cultivate their milpas and carry wood and provisions. They tend livestock, if they have any; do rope work, leather work, woodwork, and build the houses, although they may be helped in the transport of materials by their women. They some-

times help the women about the house in such daily routines as shucking and graining corn off the cob. They hunt and fish and go upon journeys. Some play the violin or "harpo," or sing at *tuwuris*, an activity that may be a kind of duty within their religious structure. The sons help their fathers, beginning at a very early age, and thus learn by traditional methods. Primary instruction in both sexes is therefore a part of the family institution, the basic educational and social unit of the Warihio. This working-learning method by both sexes was observed in many instances.

SHELTER

The common house (*ka'li'*) of the Warihio is of mud-wattle with a palm-thatched roof. It may or may not have a foundation of stone, either mortared with mud or laid up loose. The sides are constructed of upright poles (*otona*) embedded in the ground, between which are laced pliable sticks. Mud in some cases is plastered to the sticks, but more often they remain unmortared on two, three, or all sides. Or again a simple stone and mud-mortared wall may be used under the palm-thatched roof (pl. 33, *a*), which in this case is probably a result of the Russo influence around Guasaremos. Sr. Russo immigrated to Guasaremos about 1890 and built fortlike houses of mud and mortar with shake or tile roofs at Guasaremos and El Limon. It is evident the Warihio has been rather quick to adopt new types of construction and one wonders if the mud-wattle is not a recent borrowing from the Mayos. Usually the shelters are rectangular in outline, but there is one type of house with a circular outline. The sides are of loose-laid stones of a variable 2- or 3-foot height. Over this is laid the peaked palm roof, here taking a circular form. A circular type of house is represented in the ruins (pl. 31, *b*) and suggests that it was the earlier and perhaps even the original type of Warihio construction. Many of these were discovered during explorations through the Rio Mayo barranca country in areas which are uninhabited today. Both the rectangular and circular types of houses are used for dwellings today.

The roof is formed with a ridgepole (*huseda*), two side ridgepoles (*kenori*), rafter poles (*mordasa?*), and across the latter are laid slender, light, strong *otate* poles (*sewula*). Upon the *otate* poles the palmetto leaves are lashed with palm-leaf fiber thongs, overlapping like shingles. Along the ridge top, pairs of short, heavy sticks are tied together and placed astraddle, functioning as a weight upon the last loosely tied row of palm leaves.

In the lower towns, as in San Bernardo and Chorihoa where there are no near palms, the Warihio construct the flat mud roofs of the Mayo or Mexican. They still retain, however, the mud-wattle sides.

Woods commonly employed in Warihio construction are:
For stout uprights:

Mauuta
Palo colorado
Vara prieta
Guayacan

Lysiloma divaricatum
Caesalpinia platyloba
Brongniartia alamosana
Guaiacum coulteri

For horizontal lacings:

Batayaki
Brasil^{3a}
Vara prieta
Batamote
Chicura

Montanoa rosei
Haematoxylon brasiletto
Brongniartia alamosana
Baccharis glutinosa
Franseria ambrosioides

and many others

For the roof, besides those listed under uprights:

Palma
Otate

Erythea aculeata (leaves)
Arundinaria longifolia (poles)

The houses occupy a characteristic position in reference to the terrain. They rest upon natural eminences, "mesitas" or hillsides, from one to four hundred yards from the water supply, which is usually an arroyo, or less often a spring. The eminence provides protection from the floods suddenly arising in thunderstorms, and the distance from water is protection from many insect pests, such as gnats and mosquitoes. Carrying water up the hillsides, of several hundred feet altitude, is very laborious.

A small plot around the house is kept clear of "monte," i.e., weeds and brush, though often great boulders will clutter the terrain, as is the case with houses at Guasaremos and Saguacoa. There is, however, at least a small flat area near the house where the religiously required tuwaris are held. In Guasaremos there is a house (pl. 37, *b*) used as a kitchen, whose earthen floor has several round boulder tops issuing from the ground, while not 10 paces aside is a flat clear space used for dancing tuwuri.

Many families have one house as a kitchen and another as a storehouse and for sleeping quarters. The former is hardly more than a palm-thatched "ramada," while the latter is better constructed with tighter and more complete siding. In it are kept the few valued possessions, as clothing, rattles, violins, and very often maize.

GRANARIES

Storage cribs commonly occupy a quarter or a third of the space in the larger dwelling. They are raised from the earthen floor about

^{3a} This is a stiff-branched shrubby tree; hence the sticks may be cut half through to make them bend about the upright.

a foot. The bottom of the crib is of poles, while the sides are fashioned with sticks of otate or batayaki placed perpendicularly. Such storage bins are found throughout the range of the Warihio.

Sonovoris (tekoa') are curious circular granaries of masonry set aside from the house (pl. 32, *a*). They are made of mud and stone with a mud cap supported by closely laid wooden poles. The outside dimensions are approximately 6 to 8 feet high by 4 or 5 feet in diameter. These are found only on the Tarahumare side of Warihio land, as in the Guasaremos locality, and hence may be regarded as a recent borrowing. Illustrations of the similar Tarahumare structure may be seen in Lumholtz (1902, vol. 1).

STORAGE CAVES

In the Guasaremos locality there are occasional small caves (pl. 32, *b*), containing 3 or 4 cubic yards of space, which have been used recently for storing maize and anciently for storing acorns.⁴ The openings were closed by mortar and stones. Some are in distant and obscure places, from a mile to a league distant from the nearest dwellings or ruins. Bartolo says that some of the Indians still have such little caves for storing their provisions and that those of the Rio Mayo, living in the vicinity of Aquinavo, Tepara, and Yuromo, still have hidden storage places where they cache maize they have stolen from other localities. Macedonio of El Limon charges the lower river Warihios with stealing from his isolated milpas. Several of the Indians who formerly lived in Guasaremos had hidden caches of maize. Similar storage caves were observed in an uninhabited district of Sierra Saguaribo, and others were reported from Sierra Canelo.

Caves or caverns are still used as temporary living quarters or camps. Two were observed in Guisiego where families of the Warihio had lived the year before while they were tending their milpas during the summer months. Upon the rock walls were petroglyphs, crude drawings of domestic animals and men and others of a symbolical nature. They appeared to be not very ancient, probably drawn within the last 50 or 75 years, a hundred years at most, and were no more than a thin lime wash traced upon the rock (pl. 35). The family of Lolo, a Warihio, was photographed living under the edge of a large boulder, following the burning of their house several months previously (pl. 33, *a*). A cave near San Bernardo was inhabited a few years previously by an old solitary Indian.

⁴ Hulls of acorns were found in the bottom of one or two of the caves and again in the burial caskets of the dead.

ELEVATED STRUCTURES

Near the house there is usually a platform, about 5 by 7 feet, raised 4 or 5 feet above ground (pl. 30, *a*). It is made of poles and upon it dishes of food, ollas, etc., are laid with some security from prowling dogs and other domestic animals.

A like structure is the elevated garden (pl. 33, *b*), formed in the same manner with poles and supporting a little earth, where such as green onions and chiles may be germinated. Both the Warihios and Mexicans call them "tapancos." These two structures are also found among the neighboring Mexicans and Indian tribes.

SUBSTRUCTURES

"Wehcari" is the Warihio name for a small chamber dug in the earth and topped by a low roof of palm leaves. It is a storage chamber, containing 3 or 4 cubic yards of space, for palm and other leaves where they will remain comparatively fresh and moist until time of use. They are common throughout the Warihio country.

Sweating chambers might identify small pits half covered by loose palm leaves observed in the sand banks of the Guajaráy at Conejos and again on the Rio Mayo in Carimechi. No certain explanation, however, was obtained for them.

FURNISHINGS AND TOOLS

The following articles are listed as possessions of the present day Warihios. All of these are never found in any one house, many having only a poor minimum of a couple of "petates," sitting logs or benches, baskets, earthen dishes, a "metate," "machete," hoe, and a few other odds and ends. When a family goes visiting or to tuwuri for a day or two, many of their possessions are carried with them. This they do in fear of robbery in their absence and for need of them during their visit. Figure 12 indicates the simplicity of some of their furnishings.

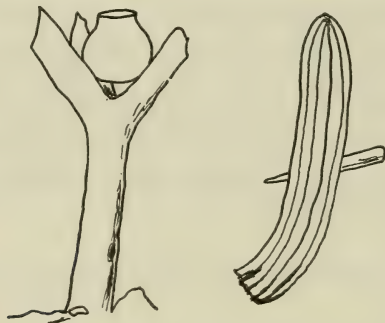


FIGURE 12.—Exterior furnishings; an olla stand and a peg in a pitahaya.

Furnishings:

Chair

Stool (banko)

Tapesti (a rack of otate poles laced together with rawhide and laid across a couple of small poles either upon the ground or elevated. Over this a "petate" mat is thrown and the whole used as a bed)

Guacali (swinging cradle, see "Woodwork")

Sitting logs (chunks of wood)

Benches (crude, hewn out of a tree with an ax or "machete," the legs usually an inverted forked branch)

Pottery iron (for ironing clothes)

Table

Basket

Bull scrotum bag

Earthen dishes: water olla, cooking olla, eating bowls

Gourd dipper

Wooden bowl

Wooden spoon

Metate and mano de metate

Blanket

Tools:

Machete

Ax

Knife, butcher and pocket

Steel needle

Hali (see "Olla," p. 114)

Smoothing stone (ibid.)

Loom (horizontal)

Hoe

Shovel

Broom (a bundle of sticks)

Hand broom (made of palm leaf for cleaning metate)

Colote (carrying frame)

HANDIWORK

POTTERY

Pottery is of the coil technique and undecorated. The materials employed are a red clay, dug from the best formations nearest to the potter's hand, and sand from the arroyo beds. There is a difference in quality, recognized by the natives themselves, depending upon the locality from which the materials are taken, and upon the craftswoman. It is thick crude pottery and in general appearance similar to sherds found about caves and ruins. The technique, as observed in the work of Licha Acuña, is given below. She was taught, she says, by her grandmother who was a Warihio.

Red earth is dug from the ground at a spot near the house of Esteban's brother. Sand and water are brought up from the river.

The dry chunks of red earth are pulverized, partly by grinding between two stones and partly by breaking and mashing with the fingers. The red earth is moistened with water until it is of a sticky consistency and put into a bucket.

Licha sits upon the ground and on a large flat stone beside her mixes sand and the sticky red earth with the help of water. First she puts a double handful of sand on the flat stone, then a double handful of water from a bowl beside her. Then she adds the sticky red earth and mixes and kneads the whole together. She adds more water and more earth until, under the skill of her kneading, the mass assumes a malleable consistency and may be called potter's clay, "wehcho'li."

THE OLLA

With the left hand the potter takes a chunk of potter's clay; with the right hand she starts work upon it, pressing and hammering with the fist, until a shallow bowl is formed. This is placed before the potter on a wooden tray.

By whirling the lumps of clay between two extended palms a long round string is next worked out. This is held in the left hand dangling over the shallow bowl below, until the right hand presses its lower tip to the round bowl edge, and the whole string is lowered and laid around the bowl edge. With the thumb and forefinger this new stratum of clay is pressed onto the top bowl edge. The two meeting ends of the coil are carefully pinched together until they taper and overlap.

With a "hali," a piece of the rind of a native gourd dipped in the bowl of water, the worker presses and smooths the coil upon the bowl foundation. The right hand with the "hali" works against the left hand held within on the inner surface of the bowl. Every now and then the "hali" is dipped into the water, so that the surface of the growing olla is kept moist and workable. Gradually, with the outside, down stroke of the "hali" the coil becomes a smooth continuation of the bowl. Then a horizontal stroke is used both inside and out, further smoothing and integrating the whole. Special care is given the meeting of the coil. For each successive coil this technique is repeated and as the olla increases in diameter, two round strings of clay are necessary to make one encompassing coil. The growing weight of the clay presses downward upon the plastic bottom until it flattens a bit of its own accord.

As the potter works the bowl is turned round and round and here the use of the wooden tray below expresses itself. Having less adherency than the moist olla it turns easily upon the ground, adding considerably to the facility of the whole process. The last coil is

left thicker than the others thus forming a rim, which is leveled, scraped, and turned outward with special care.

After this the vessel is allowed to dry for an hour or so. Then it is polished. For this a small river stone is used. It is alternately dipped in water and rubbed on the bowl.

THE SMALL BOWL

In making small bowls, coiling is not necessary. The bowls are formed by working the clay in the two hands, as in beginning an olla, and then by smoothing and polishing the bowl with the "hali" and stone.

FIRING

Before the new pottery is fired it is allowed to dry in the shade (in the house) for a day or two until it is hard.

The olla is placed in the fire with a good supply of wood laid around and over it. When the wood burns down, until even the coals are low, the olla is taken out and considered a finished product. It may remain in the fire for 5 or 6 hours. For smaller pieces a couple of hours in the fire is considered sufficient.

WEAVING

Baskets (wari) are made from two plant leaves; sotol (*Dasylirion wheeleri*) and palmita (*Nolina matapensis*). In both plants, it is the growing cone of compact terminal leaves that is selected. The leaf of sotol is armed with lateral spines, which are scraped off before use. The larger, stronger baskets are made of the sotol.

The baskets are unornamented and are of one weave only—a simple "over two under one" with an occasional broad "skip belt" as a border near the top. The beginning of a basket is started with four units, each of three leaves.

"Petates" (hi'peta) are made with the same weave as the baskets but only the leaves of palms are used. The strips are woven double into mats about a yard wide by two yards long, which are used for drying tobacco, fruits, seeds, etc., and as a bed at night. The word for bed and "petate" is the same in Warihio.

Blankets (keyma') are woven from the wool of sheep. No dyes are used, but the brown and black wool, which frequently comes from the herds of neighboring Mexicans, is often woven in as ornamental solid terminal borders. The weaving methods or tools have not been observed. The loom, however, as described, is horizontal.

Hats (sawo') are made from the leaf of a plant known as yerey palma (wechasas) which grows only in certain localities, one near Conejos. The hats are readily distinguishable from the Mexican

"sombreros," for, though they have a "sombrero" shape, they differ in being smaller and of finer weave. They are the one article on a dressed Indian which most quickly identifies the wearer as Warihio.

WOODWORK

The men have developed considerable skill in working wood. Their tools are very limited, being in most cases only the ax, machete, and pocket knife, or butcher knife. The materials used are those which they cut out of the living trees around them.

The classic violins and harps are their finest productions. A tree known in native Spanish as palo chino (*Pithecellobium mexicanum*), is employed for making the box and neck. The bridge is made of the soft wood of the guasima tree (*Guazuma ulmifolia*); the bow, of horsehair and a branch of a hardwood tree such as the chirowi (*Acacia cymbispina*) or palo fierro (*Pithecellobium undulatum*). The chin rest of the violin is made of bull horn, and the gut strings are bought at the Mexican stores.

The instrument known as the "harpo" is the Mexican harp (pl. 6, a). It is provided with a double leg at the lower end, so while the neck piece rests in the lap of the instrumentalist it reclines in a horizontal position and is so played.

Glue for sealing the joints is obtained from an epiphytic orchid, kiki (*Laelia autumnalis*). The bulb is skinned and rubbed directly upon the jointing surfaces, leaving a sticky excretion that holds strongly.

Gourd rattles (hali' ?) are made from the fruit shell of the vine, buli (*Lagenaria siceraria*). They are simple in manufacture and undecorated. Stick handles are run through diametrically, after the insertion of a few rocks or seeds.

Chairs and stools or "bankos" (wanko') are made in Carimechi. Detailed notes of "banko" manufacture follow.

The maker of the "banko," Esteban Suha, selects straight young branches from the guasima tree (*Guazuma ulmifolia*), 3 or 4 inches in diameter. These he splits in the center with his "machete." From the inner side of the half, he splits off a strip, 3 feet by 2 inches by three-eighths of an inch thick. With the "machete" the bark is trimmed from the edge.

The soft pliable wood is then easily bent into a hoop about a foot in diameter, the two ends overlapping about 3 inches. The new circle is secured in this form by a heavy twine made of twisted palm leaves tied around. A second hoop is made and the diameter matched to that of the first by tightening or loosening the twine encompassing the hoops.

Next, with the aid of a hot pointed iron, holes are bored through the overlapping ends of the hoops. Through these holes rawhide is tightly laced. The temporary encircling twine is removed and eight other holes evenly made through the hoops. Thus the two hoops for one "banko" are now complete and ready for the supporting spokes (tauwureti).

The supporting spokes are made from the same wood as that used for the hoops. The small sticks are first split out with the "machete" and then dressed down with a knife. They are bound at crisscrossing angles to the hoops. Through each hole of the hoops rawhide is passed and a pair of spokes lashed, one outside and one inside. Notches are cut around the ends of the spokes so that the rawhide thongs will hold the spokes securely. Finally a piece of cowhide is cut to fit the top of the "banko" and lashed on with the rawhide thongs.

Other wooden artifacts which the men make are hoe and ax handles, pack saddles, bowls from the giant roots of the wild fig trees, long handled spoons, and "guacales." These latter are crates of sticks, cut from the guasima tree and lashed together into a rectangular form a foot or so in depth. They are widely used in Mexico for transporting fruits, vegetables, and other cargo on pack animals.

ROPE WORK

Small rope and cords are made from plant fibers; fibers of the palm leaf and of the agaves are used and probably others also. The strands are twisted or twirled in threes. Stems of tough pliant vines are also often employed as emergency cords for carrying in an object from the forest or fields, i.e., the feet of a captured cholugo (*Nasua narica*) may be bound together and the animal thrown over the shoulders, or a bundle of leaves or wood tied up.

PETROGLYPHS

Rock drawings and scratchings are found in many localities. Many are reported from an arroyo above Satajaqui at the western foot of Sierra Charuco, and some in an arroyo immediately below Guasaremos. Two localities of rock drawings were visited near Conejos on the Arroyo Guajaráy and one at Guisiego near Guasaremos (pls. 34 and 35; fig. 13). Both are in localities where shallow caverns show evidences of past habitation, as bits of old burnt sticks and fire-blackened rock walls.

Many of the present Warihios do not admit to the drawings, but say only that they were made by "los antiguos," in such vagueness that one cannot know whether they refer to their own ancestors or

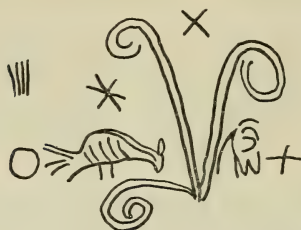


FIGURE 13.—Pictograph along Arroyo Guajaráy near Conejos.

to others. Only one, Licha Acuña, stated directly that they were made by the older Warihios.

Two methods have been used in drawing them: by rock chipping and by dyes. Many of the dyes are very enduring and cannot be removed after these long centuries with soap and water or alcoholic liquor, the substance having passed into the grain of the rock. The colors red, green, brown, and orange were observed in the paintings in Arroyo Guajaráy (pl. 34).

TRANSPORTATION

The Warihio carry their own burdens, the women with ollas or baskets upon their heads or arms, the men with the burden on the shoulder or back. The children grow partly under burdens and are strong from carrying them. In Mexican towns they use the yoke, but its lack is often observed in the barrancas.

They occasionally employ burros for carrying maize or palm leaves long distances. The use of the burro is not habitual as it is among the neighboring Mexicans. The Warihio has but infrequent use for beasts of cargo, as he is accustomed to carrying his harvests, and he enters but little into even the small world of trade peripheral to his area.

The following story by Bartolo Hernandez, of Juan Palomo, a Warihio, who lived several years ago in Canelo, reveals much of life and customs in the Warihio world.

Juan Palomo was noted for his great strength, being of short stature but of enormous width of heavy hard muscle. When rather an old man he could still carry a "fanega" of maize (ca. 200 lbs.) from El Limon to Canelo, a heavy load for a strong burro, a distance of approximately 5 leagues, or about 15 miles. The trail led up over a high mountain ascending perhaps 4,000 feet of altitude. On his last trip he left El Limon with 100 pounds or so of wheat and a bale of cloth, the load upon his back secured with a strap around his forehead. Two-thirds of the way up the mountain he stopped at a stream to drink and bathe. The day was warm, and no doubt the old man was in a sweat. Eight days later some "vaqueros" (cowboys) found buzzards at feast upon his remains and his cargo still sitting secure and neatly beside the trail.

DRESS AND ORNAMENT

Until recently the Warihios went about without clothes. Children still are commonly naked and occasionally naked women were observed in the evening about the house fires near Carimechi. Now the prevailing dress among them is the usual Mexican habit (pls. 36, *a*; 37, *b*). A singular form of dress was observed on Warihio men along the Rio Mayo: loin cloth and back-cover. The back-cover consists of a rectangular piece of white clotton cloth hanging over the back, secured by a cord around the neck and waist. It appears to have been the customary form of early Warihio dress, as it is worn only by the more remote Warihios. Boys beyond baby stage and until the age of puberty usually wear a loin cloth; thereafter they clothe themselves in any garment they are able to secure, which is frequently ragged.

The "chairígora" is an anklet composed of a string of lepidopterous cocoon sacks. The sacks are tough, ovoid in shape, and provided with little pebbles that rattle rhythmically upon the legs of men dancers. They were observed only upon such occasions and are similarly employed by the Mayo and Yaqui Indians.

The Warihio are said to have painted their faces in times past when going into battle. How different must have been the men then, for now they run from any suggestion of strife. Near Guasaremos there is a locality known as Canyon Chanate, where until a few years ago there lived many families of Warihios. They came thither from the lower towns to escape the danger of revolution, until at last for many years the lower towns were peaceful again. Then they left their mountain hideaway about 1931 and returned to Conicari. Mexican conscriptors were wont to haze them away to be soldiers. There is another such retreat near San Bernardo known as Pericos, to which the Warihios of San Bernardo retired for a while during a local war several years ago (1926-27), when the Yaqui rebelled against Mexican ingressions. My census-taking questions, coupled with my notebook, aroused suspicions and may account in part for the empty homes I encountered during by first season's travel among the Warihio, as it was later explained that the Indians mistook me for a Mexican conscriptor.

Warihios living in the vicinity of San Augustin are reported to wear a long lock of hair over the front of the face, called "un capote." The conservative Warihios, wherever observed, generally wore their hair long, falling down over their shoulders and backs, while the less secretive wore it cut into a short bob (pls. 37 and 38).

GAMES

The Kicking Race Game is played at Guasaremos and Bachoco and probably at other localities also. Two teams of several players each race around a given course "foot-throwing" a heavy wooden ball always before them. The ball is not kicked in our usual sense of the word. The foot is slipped under the ball and then the ball is projected forward from the dorsal forepart of the foot. The players race up and down or around a given course and when one side succeeds in throwing the ball over the head of a laggard of the opposite side, he is eliminated from the game. Thus it is a contest of endurance and elimination. The balls are made of wood of the guasima tree (*Guazuma ulmifolia*); before they are used they are soaked in water to make them heavier and far carrying.

Inordinate betting accompanies the sport. Nearly all forms of personal property are wagered: cattle, blankets, coffee, sugar, tobacco, money, etc.

The Warihio girls are reported to have played the same game in the Arroyo Guajaráy country and at San Bernardo, only instead of kicking, the ball was tossed ahead by long handled "rackets" (ka'to') (fig. 14) made for the purpose. Men patrolled the sides of the course to toss the ball back if it was thrown aside in the "monte."



FIGURE 14.—The ka'to, according to oral description.

At San Bernardo, Arroyo Gochico was used as a running course for both games. The game of the men is known generally as "wohi-mari" and in Warihio as "womihiba." The Warihios call the women's game "wochihibalo."

SOCIAL INSTITUTIONS

MARRIAGE

Marriage, says Lusiano, is without payment and with whomever one pleases, sometimes with cousins—not with brothers or sisters.

The priest, "selyeme," when he comes is paid three pesos by the Warihios; no one else is paid anything whatever, neither the father nor the mother of the girl, nor the parents of the boy.

One Warihio, Sebastian Rodriguez, "flojo," living in Babicora has two wives. They are not sisters.

Marriage is arranged by the fathers. The father of the boy visits the father of the girl and the two agree on the union. The young man thereafter goes to the house of his future bride, where he resides for an indefinite period, a few days to a month. At the end of the period he conducts his bride to their new home which he, perhaps with the help of his father or brother, has previously built, usually in the vicinity of his father's house.

Trouble between husband and wife may bring punishment administered by the selyeme. One or both of them are beaten with a stick. The selyeme can also dissolve the marriage, which he does by striking husband and wife with three symbolical sticks. A recent family upset occurred last year in Guasaremos between Vicente Guireña and his wife, and was narrated to me as follows:

One day a young girl came to live with Vicente and he, thus attracted by other fleshly conquest, sent his old wife (still young) out. Bartolo encountered the angry wife departing, who gave him the story. By threatening to send Vicente to jail and sending the new girl home, he successfully mediated the matter and Vicente still keeps his old wife in Tiruta. "She," says Lusiano, "goes naked, for Vicente is very lazy; plants only a little milpa which goes to weeds."

In Guisiego there is a Warihio orphan child adopted by the good Mexican, Antonio Bringas. He adopted the girl 3 years ago after taking pity upon her as she wandered unguided from one poor hut to another.

THE SELYEME

His chief functions are to conduct ceremonial *tuwuri*, provide medicine for the sick, and adjudicate matters pertaining to marriage. His consultation and permission is sought for holding *tuwuri*, details of which are given under "Ceremony." With the ripening of maize and squash in late summer he becomes very busy, almost sleeplessly going from one house to the next to make *tuwuri*. In such times he is heard to remark upon the arduousness of his duties, unconsciously perhaps to argue justice for the food tax he levies on his neighbors—perhaps a burro load of squash and maize or a quarter of a goat.

The people must await their turns; hence, it is self-evident that a consequent authority grows up with the selyeme, as the people must ever run to him for assent to their ceremonial plans. It is a form of chieftainship or priesthood.

The extent of his medical administrations are unknown. He may visit the sick, or messengers are sent to him asking for medicine. As related by Lusiano, the messenger, usually a member of the afflicted one's family, tells him what the sick person is supposed to suffer. The selyeme then makes up an herbal medicine (or a medical counter-belief) with which the messenger returns. According to Lusiano, the selyeme does not hold forth with any ritualism in curing the sick, nor does he make recitations, but only gives medicines of herbs. How far this limitation carries in the area is conjectural. He is reported to adjudicate troubles between husband and wife and can initiate divorce. Though no information was collected showing his function at the time of marriage, the above paragraph on marriage indicates he may have an important influence on the maintenance of marriage as an institution. In this and in other frictional matters he may operate as a conciliator or judge.

When a selyeme dies, the people of his community select another to replace him. He will be chosen from among those who sing best and know best the Warihio songs, especially if he also knows the religious recitations—he will probably be the selyeme's son. He is asked to officiate at the next *tuwuri* and from thence his tenure in office begins. His selection, so far as is known, is done rather casually by community consultation and without ceremony.

The office has a general looseness and immaturity about it. The religious recitations practiced at Guasaremos are said to be lacking among the Warihios along the lower Rio Mayo, and previous to the present selyeme in Guasaremos also. The present selyeme there is Cosme Valdez, the son of a selyeme, and comes from Loreto. Other localities reputed to have selyemes are: Loreto, Arechuybo, Gachavachi, and San Luis Barbarocos. It is said that the chief of all the Warihios lives near Loreto.

BIRTH

The Warihio wife beds down alone in the house upon a "petate" on the ground. The husband remains nearby to see that all goes well. If it does, he may continue to sit at the house or take up some occupation. If the wife has trouble he goes for the selyeme, who may be a considerable distance (several hours) away. In one case under discussion⁵ the assistance of the selyeme, Cosme Valdez, consisted of the selyeme getting hold of the infant's foot and pulling it directly out. Both the child and mother died. Any phenomena of a *couvade* nature were denied. If the delivery is normal the woman rises the next day and carries the child down to the arroyo and washes it and herself.

⁵ Recounted by Bartolo and his wife.

At that time she gives the child its name. Thereafter she returns to her habitual tasks and the care of the child.

WARIHIO NAMES

Among Warihio names there are: Juan Antonio Chapapoa, Tiojilo Taquachi, Crisanto Taquachi (*Taquachi* sp., opossum). Near Plantonita there lives a large family of Coyotes among whom are; Juan Coyote, Manuel Coyote, and Angel Coyote. Neighbor to them is a family of doves: Juan Palomo, Matiana Paloma (wife of Lusiano Guireña). Among others are Juan Campa, Nicolas Anaya, Felipe Anayña, Vicente Guireña, and Santana Vecerro (calf). Then there are Marciel Chirowi, Leonicio Filaremos, Marcos Guasaremos, and Felipe Chanate, whose last names are those of the localities from which they came, respectively, or in which they live. Chirowi is also the name of a thorn tree (*Acacia cymbispena*), and Chanate the Mayo name for a bird.

Thus is the simple origin of Warihio names—the assumption of common Spanish first names seconded by some other designation whose selection is not always clear. Those containing place names are easily understood. Surnames such as Campa and Guireña are obvious annexations of Spanish appellations. The preponderance of animal names is not easily explained, and those with whom the writer talked threw no further light on the subject.

Concerning the Warihio names before the intrusive Spanish factor, there is a little to note. Juan Campa said that earlier the Warihios had no certain names or Christian names, but were called by whatever name happened to fasten itself upon them as they grew up. All the Mexicans and Indians at present distinguish between the name given them at birth by their mother and their baptismal name, taken from their saint day and pronounced by the priest. They are commonly called by the name their mother gave them, since they are often half grown or fully grown before a priest gets around to call on them. It would be rather difficult to change over, yet it is their baptismal name which they consider real. It is probably the baptismal names to which Licha Acuña referred when she said; "The antiguos (Warihios) lived in nakedness, foraging upon the natural wild food, without names, like animals."

The Warihio are self-conscious and sensitive over any intimation of namelessness, as though from the tongues of Mexicans they had been put to shame, and bitten with the same contempt loitering in the words of Licha.

BURIAL

Today the dead are buried in the earth. In Guasaremos are graves a mile from the nearest hut. The comparative age of the persons at time of death may be estimated by the mound of stones capping the interments: those for children are small; those for adults, large. In San Luis Barbarocos, graves have been made at the site of the old Mission, between its front and the separate belfry. The most recent graves are almost under the church porch, as though with proximity they were gradually creeping up to a greater sanctity.

In times past the dead were trussed up into large baskets made of palm leaves or of carriso and cached in caves, the openings of which were walled shut with stones. One such cave was visited in Sierra Canelo. Cattle had gained entrance to the large half-open cavern and had eaten many of the burial baskets and trampled and broken the bones of the dead. Pedro, the head Warihio of the town of Loreto, said that many Indians had died and been so buried at the time of the cholera. Hair and pieces of skin still adhered fragmentarily to some of the skulls. The following articles were collected among the scattered bones: crude shell beads, two samples of "petate" baskets on the northern slope of Sierra Charuco, is reported to be another cave burned bone, a sherd, and hulls of acorns. These last were provisions for the dead and had been placed inside the baskets. Near El Limon, in the northern slope of Sierra Charuco, is reported to be another cave containing a similar cache of ancient dead. Others also from indefinite localities have been reported.

The occupants of several graves disinterred in the valley of Guasaremos are not so easily identified. They were discovered several years ago when a hole about 8 feet deep was excavated for making a "maya," mescal roasting pit.

The oldest Warihio, now dead, had no memory of them. Their depth indicates a considerable duration of soil deposition, which, considering the round contour of the bordering hills, is at slow rate, though Bartolo says he can note a certain filling in the area surrounding the graves during the last 20 years. What ancients could they have been? A hundred years ago the Warihios did not bury their dead, or at least there is good evidence to show they were sewn up in carriso or palm mats and cached in caves. There were no Spanish-speaking people here previous to old Sr. Russo who came 40 or 50 years ago.

It is still possible, however, that they are the remains of early Warihio converts of the Jesuits, whose influence was established in the early part of the 18th century, and emanated from two mis-

sions—one in Conicari and another in San Luis Barbarocos, still standing and attended by the Warihios, though there is now no priest present.

The Warihios burn or abandon a house in which a person has died. They construct another in a different place. At the funeral a fiesta is held during which plenty of food is served. In the grave with the dead they leave some tortillas or other provision, and upon the heap of rocks are placed little bowls of water, beans, and more tortillas. These offerings upon the graves are replenished from time to time. The fiesta is made to facilitate the entrance of the dead to "Tata Dios," and the food is for their journey thence.

CEREMONY

In Loreto for the planting of maize the Warihios hold a ceremony conducted by the "selyeme" (fig. 15). The seed to be planted is placed before the cross and a recitation is made over it. The ceremony was said to be conducted in a manner similar to that described below for tuwuri. Other allusions to planting indicate this ceremony is common practice, a belief being that a blessing guarantees a harvest.

When the seed is grown to ears of corn, another ceremony is made. In this ceremony grains from the first roasted ear are scattered into the air during the recitation. A good believer will not eat of his corn until this ceremony has been performed. Such a one was Pedro, Warihio headman of Loreto. Though it had been a long year since he had had the pleasure of eating fresh corn, he stayed his hunger for a week or more while he awaited the coming of the "selyeme." He did, however, sell roasting ears to our party, because we were hungry travelers and our guide, his friend. His house and milpa are shown in plate 10, *a*.

Nearly all social and ceremonial life centers around the tuwuri (fig. 16). At them the people gather to talk, laugh, dance, sing, and make obeisance to the supernatural dieties. They are a definite form of ritual actively leading and sustaining them toward a tribal unity. In them are perpetuated the tradition, custom, and religion of the Warihio.

There are two classes of tuwuris or fiestas, though their differences were never clearly defined to the author. Those visited were of one class and performed with the ripening of cultivated plants about Guasaremos. They are conducted to give thanks to "Tata Dios," for the rains, the foods, and for everything that the Warihios enjoy or need. The sons of "Tata Dios," who are the Warihios, believe that three tuwuris, each with its individual ceremony, are necessary to

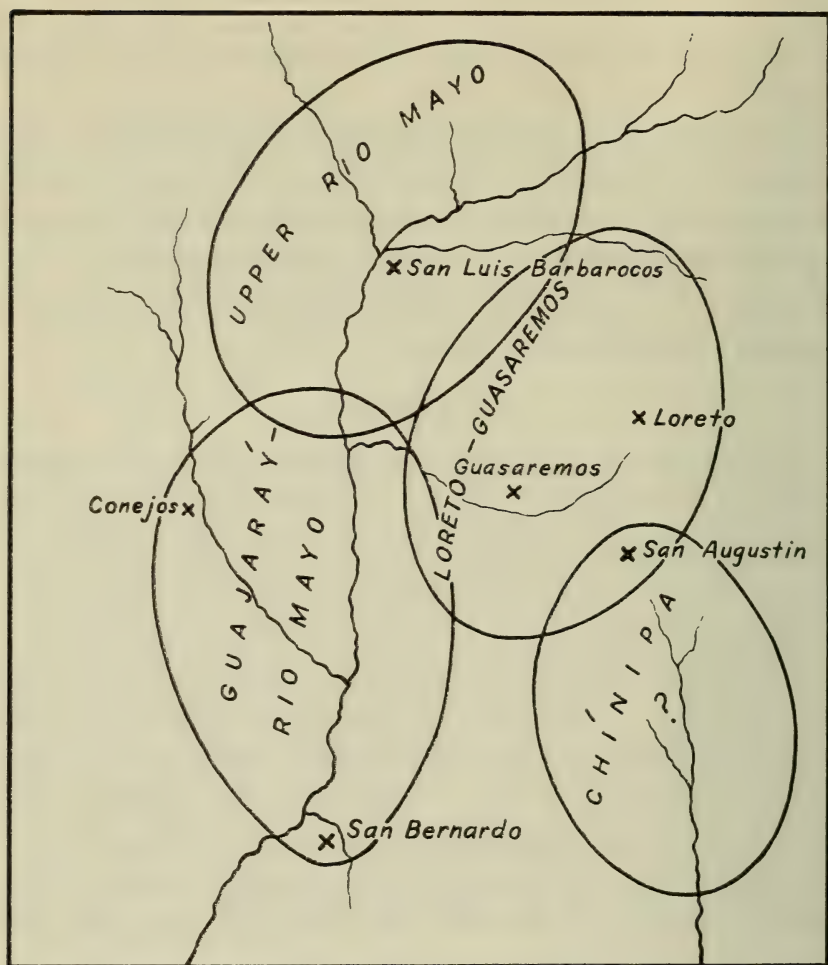


FIGURE 15.—Ceremonial groups or areas of social exchange.

accomplish the thanksgiving. Each household tries to have the three some time during late summer and fall. Thus, as long as plenty of food lasts they are busy with *tuwuris*: the “*selyeme*” in traveling from one household to the next and officiating; the householders in harvesting their beans, corn, and squash; carrying them to the houses; preparing them; and gathering and transporting the wild agave plants for making “*tesguino*.” When not directly concerned with the production of *tuwuri* they can keep themselves occupied going to those of their neighbors. The differences between the three types of thanksgiving *tuwuris* are only partly discernable to a green observer. The recitations, some of the songs, and a few of the dances

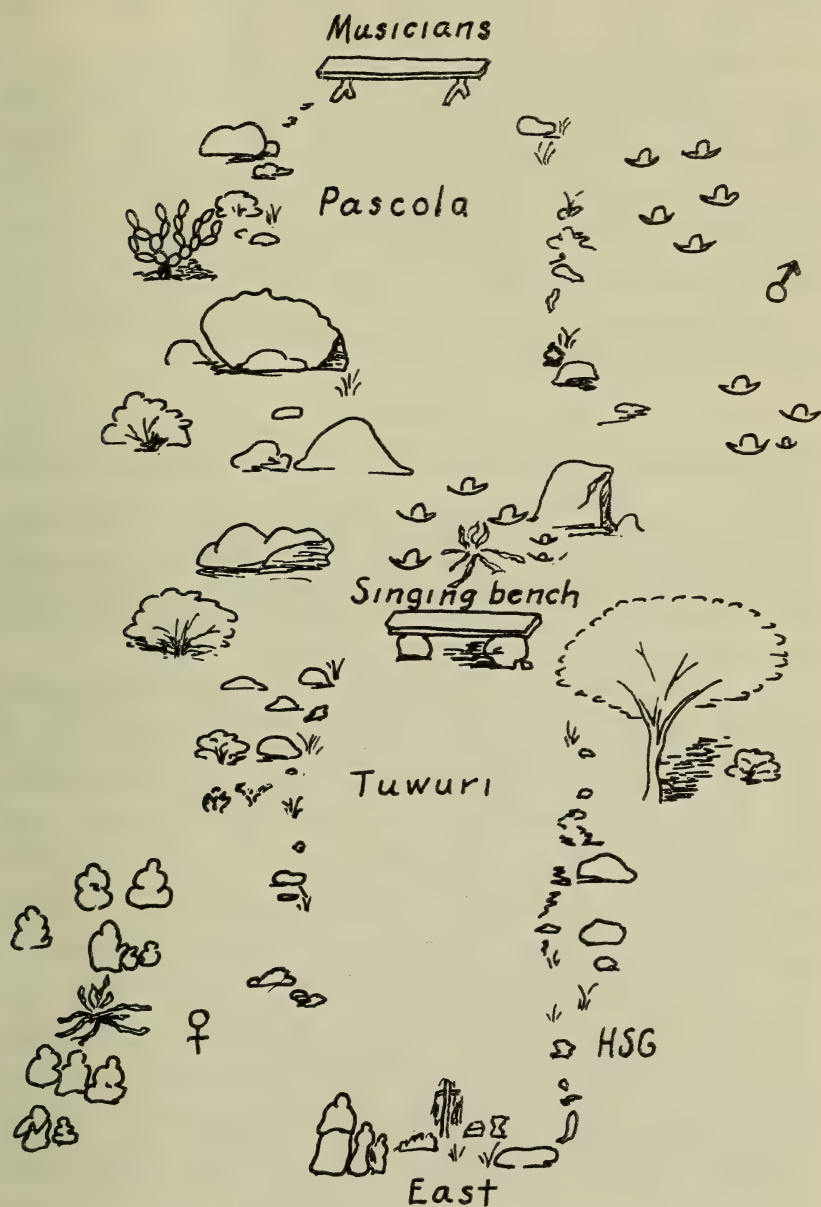


FIGURE 16.—Diagram of tuwuri and pascola setting.

differ, while the general order of things remains unchanged. The system as a whole is enough to show that there is a definite system of ritual carried on as a structural social pattern.

One does not know his fellow man so much by the custom of greeting upon the street as by his social and habitual structure carried like a heart within. So may the Warihio and also his many mysteries of origin and place, be known by his self-expression timidly given in his indigenous system of song and story. If the Warihio have any tribal coherence there will it be expressed. It is the fulcrum on which their hazy tribal unity seems to turn. Hence, in view of this importance the following observations, taken from two different tuwuris of the thanksgiving type, are written out in detail, and scenes of the dance are shown in plates 37 and 38.

TUWURI

Second night; ceremony said to be the same as that of the first night.

A small cross about 2 feet high stands at the east end of the dancing flat. It is shrouded in a plain white cotton cloth and ornamented with a necklace of grass beads (job's tears) and a medallike ornament. Near it upon the ground is a small bowl filled with incense and another bowl in which the incense is burned.*

The selyeme rouses himself in the late afternoon from his sleep under the shade of a tree near the house of the host. He shakes out and carries to the foot of the cross the petate on which he has been reclining. Upon this he spreads a white cloth. The host brings out food—beans, tortillas, and water—until there are a dozen or so little bowls which the selyeme spreads upon the cloth. He kneels before the cross, the food offering between, and makes crossing gestures up and down his face and breast. The motions are similar to those of the cross of Catholicism, but they are more ornate and sustained. Then with a dry cornhusk he tosses beans from the bowls around him into the air. He breaks off pieces of tortillas and also throws them about him in the air, from where they fall unnoticed upon the ground.

He retrieves some hot coals from the fire and drops incense upon them in the incense burner. He makes gestures with the burner emanating smoke before his body much as he did with his hand, then he passes it over the food spread toward the cross, and once more

* Incense is in the nest of a solitary mason wasp built upon the face of rocks. The Indians sometimes spend much time looking for it. The nest is a mortar of little pebbles and gum exuded by one of the torote trees (*Bursera* sp.) (The gum is known in commerce as "copal"). The aroma is very pleasant and aromatic, and seems to stimulate the singers and dancers to livelier participation.

into the air about him. Again he casts up food toward the heavens and in a low monotone makes a recitation toward the cross.

The several remaining bowls of beans and tortillas he hands to the host, who carries them to the small children, who eat them. The selyeme carries a flask of water, which he pours into a small bowl and one by one proffers it to the children until it is all drunk.

He carries the petate and cloth away and returns to the cross, where he makes more gestures and places a gourd rattle with two smaller ones beside it upon the ground at the foot of the cross.

The host then serves all the guests, seven or eight families, with beans and "tamales de elotes." The guest women have helped the hostess, who has been very busy with her hands in and out of hot water, prepare the food.

Soon after eating, the selyeme sits upon the singing bench and after a short interval begins to sing. Some of the songs are sung to the children urging them to dance. The little ones gradually come and stamp time upon the ground before the singing man. A pair of girls about marriageable age enter the flat area and stand shyly beside the cross, conversing and giggling in low voices, watching the little children. Eventually they gather courage and with right hands clasped come surging and stamping in to dance in unison a yard in front of the singer. The selyeme sings on through the evening, an hour or more, until darkness.

After an interval of an hour or so he makes ceremony again. He approaches the cross, kneels, crosses himself (gestures hand up and down and across face and breast, which hereafter will be called crosses). He picks up the three gourd rattles lying at the foot of the cross, crosses himself, still kneeling facing the cross and the east, shakes the large rattle steadily for a couple of minutes, and the two smaller ones also one by one, each preceded by crosses. He rises, crosses himself, shakes the big rattle again; turns and walks back to the middle of the dancing plot, faces east, crosses, shakes second rattle for a couple of minutes; turns and walks back farther from the cross to the singing bench, faces east, crosses, shakes third rattle.

He turns his back upon the cross and east and, facing the bench, calls three men, who come and stand facing the selyeme on the opposite side of the bench. These are the three singers, whose turns in singing are determined by their respective times of arrival and their singing ability. Thus if two good singers are present, the one who arrives earliest in the evening or afternoon is given first choice and will stand at the center of the bench with the second singer on his left and the third on his right. Often the third man never sings, but is only a filler to make the three, which the ceremony requires.

The selyeme makes an address to the three men, at the conclusion of which he crosses himself and with a shake of a rattle hands the big rattle to the first singer. With the same manner and gestures he hands over the other two rattles to the other singers in their respective turns. Each singer crosses himself as soon as he receives his rattle, which the selyeme acknowledges by like crosses. Then the three singers sit down upon the bench and after an interval of a half hour or so, the mid-man begins to grunt and mumble in time to his rattle which he has developed into a regular beat and rhythm. Gradually his chant and beat quicken, his voice grows until coherent song finally swells forth to go ringing over the little group and off into the vast assemblage of confining forest trees. Soon the girls come out and dance before him. For a while the other two men continue to sit upon the bench accompanying the singer with their rattles. Only one man sings at a time.

After a couple or three hours of dancing the host again serves food to his guests; this time "wacavaki" and "tamales de elotes." The men have gathered around little fires and the musicians are warming up their instruments. The selyeme mingles with the crowd of low slow conversation. They pay but scant attention to the women who have dispersed themselves to a small fire on the ground on the opposite side of the dancing flat. Occasionally their voices and laughter drift over to the men. Their conversation is in the Warihio tongue, while that of the men, perhaps because of the strangers' presence, is partly in Spanish.

After eating, the singing and dancing begin anew. The selyeme takes another turn during the night, the one which would have been that of the third singer. Of all the men the people like best to hear him sing, for his voice is strong and melodious, his words clearer. He accompanies himself in strong stroke rhythm with the gourd rattle. He sits on the bench and leans forward as if always on his toes. While his right hand shakes the gourd, his left holds a handkerchief to the side of his head. He works hard putting most of what he has into his chanting. The gourd never stops; at the end of a song it breaks suddenly into a diffusive unaccented rattle waving the dancers back. While they walk back to the end of the dancing flat, where the small shrouded and beaded cross stands, the singing gourd seems to hold them with a promise and a power.

On and on tirelessly through the long night the dancing continues. Singer follows singer with song after song. The older women also dance and there are as many as eight or a dozen in the dancing plot at once. They clasp hands in lines of four and their regular thudding feet beat the ground to dust until it floats in smothering clouds about them and the singers. Yet the singer chants on in two or three-hour

stretches without so much as a glass of water. After each song the voice rests a moment or two while the rattle alone continues.

Then again the rattle takes up a regular accented stroke and the singer starts another song. A moment later the dancers plunge in again in long flat-footed pounding strides ending in a little jump, thudding before him. Thus dance follows dance with almost no repetition of song. The melody is similar in many and its difference depends upon the skill of the singer. In a poor singer all songs carry about the same tune, but in the best they break up into distinct melodies related only in basal structure. Thus in one evening of Warihio singing there is given a sketch of music development. Beginning with the dull tonal chants, there follows in increasing intricacy the variation of basal tonal patterns and cadences. Then there is a broad step from the voice to the instruments—for Pascola—violin or guitar, and with these latter they play the Warihio melodies and at last also the more modern Mexican pieces.

The songs fall into two classes: religious and festive. The first are addresses to heavenly deities or religious objects of worship. The opening song is sung to "Tata Dios" himself, the second to the sons of Tata Dios, who are the Warihios, and is called "koloka'" or "sogilla" in Spanish. In one *tuwuri*, *La Grulla* (*korowe'*) was sung, which is the longest and most intricate dance of any observed, both men and women participate and *tesguino* is served as part of the ceremony. It is the final song just before the closing ceremony at dawn.

The festive songs are sung for the enjoyment of those gathered. They are named after animals and definite pantomimic play actions are practiced. In *La Pitache* (wasp), women dancers leave the flat dancing space and glide among the lolling men, looking for those asleep. These they "sting" by pinching and poking them, an excellent device for stirring up the deadheads of the fiesta. It is accompanied with laughter. Another is *La Panela* (*momoha'*, a honey-making bee), "mas bravo," for the dancers pinch the ears and poke their fingers in the eyes of sleepers. In this dance they also rob the fires of burning brands in further imitation of honey gathering. In *El Aguila* (*wa'we'*) they descend upon unfortunate sleepers with "rebozos" spread like black wings and picking them up carry them back to the dancing flat, where they lay them before the feet of the singer.

PASCOLA

Immediately behind the singers' bench is the dance space for the men. They dance singly the *pascola* (see fig. 16) to the music of cello and violin. The singing of the man singer and the music of the instru-

ments have no rendered connection, yet the two function independently side by side, neither confusing the execution of the other.

The men are reluctant to start and urge one another. They dance solo, a flat-footed jig step, each lasting until either the dancer or the musicians tire. One or two wear the "chairígora" on their ankles, the swish rattle accenting the cadence of the dance. They are reported also to be worn around the waist. Some dance easily, tirelessly, and well, some dance heavily, ineptly, tiring soon; and others dance not at all but sit all night apathetically puffing cornhusk cigarettes and intermittently conversing. These latter are the elders.

The men are also reported to dance *tuwuri* with the women when there are no instrumentalists present. In the same area years before they danced much more with the women. The word "pascola" is one employed also by the general population of southern Sonora, and applies to the solitary flat-foot jig dance of the men, accompanied by instruments, whether the men be Mayos, Warihios, or Mexicans. No Warihio word was obtained for it. The dance *pascola*, as are the instruments, is probably a recent adoption of the Warihios from the Mayos. It has no ceremonial importance as has *tuwuri*, and no singing accompanies the instruments.

For a long while in the late night one of the young men sat by the side of the singer softly trying to sing. It is thus that they learn the songs and eventually become singers. Only the older men sing, and the songs are, of course, all in the Warihio tongue.

All recitations are in Warihio. It is very probable that had not Spanish-speaking people been present, Spanish would not have been spoken at all. A few of the men and many women do not speak the Spanish language.

About midnight the host served steamed squash. As *La Grulla* is sung and danced *tesguino* is served, first to the *selyeme*, who stopped singing long enough to drink, next to the dancers at certain libatious moments in the dance as part of the ritual, and last to the assembled guests. When the concluding ceremony of the *tuwuri* is done and most of the guests have departed for their homes, many of the men sit around in the morning sun drinking until the last of the *tesguino* is downed. They sometimes become drunk and sometimes sing in unison the Warihio songs.

THE CONCLUDING CEREMONY

At dawn the *selyeme* once more approaches the cross, while the small multitude sit idly, inattentively about, a few asleep. A few paces before the cross he stops, facing the east; he crosses three times, he bows three times, he kneels three times, he crosses incense up and

down three times before the cross inhaling the smoke the while. He delivers an oration of several minutes, speaking into the great east where the first colors of dawn are growing.

Next he turns and calls to the multitude about him and one by one men come to bow, kneel, and make the cross before the cross. After the men, the women line up and bow, kneel, and cross themselves. Less than half do this.

Then with the men ranged on one side and the women on the other the selyeme again stands before the cross facing east, makes gestures with the incense burner and delivers another invocation. He walks around the line of people making gestures toward them with the burning incense. Some of the men cross themselves as he approaches. To these hand crosses the selyeme replies with like hand crosses. Thus he circumnavigates his lines of people three times. No word is spoken.

Following this the host brings him something as he stands again facing the east. Then with a last gesture of the incense burner he says, "Adios, Tata Dios," and takes up the cross with its ornaments. The host brings him a broom and with it the selyeme sweeps away all tracks upon the dancing plots.

MYTHS

CREATION MYTH

(By Lusiano)

In the beginning of things the world was a "laguna," a plain of water. Tata Dios sang for 3 days and 3 nights. From the bottom he took a handful of sand and scattered it before him. These began to grow into hard land. At the end of 3 days he sent out a little white dove to see if the world had not grown hard in some part. The dove went to the farthest corners three different times. The last trip it returned and said the world had grown to land.

Tata Dios was singing all the 3 days and nights. That is why we sing tuwuri now, that we may not forget these things: Tata Dios and how the world began.

Then Tata Dios made three little figures; "ceniza," "barro," and "mona." After he had made them the three little figures asked, "Now what are we going to do"?

Tata Dios blew on them and they turned to ashes. He made them again, and again blew them into ashes. He made them again and when he blew on them this third time, they did not turn into ashes but became men. They had received the breath of life from Tata Dios. From ceniza came the white man, from barro the black man including

the Warihios, and from the third, mona some other kind (Luisiano had forgotten).

MYTH OF SAN JOSE

(By Lusiano)

One day San Jose was in an orchard very much alone. He was very sad because he was very lonely. A little bird flew about in the orchard singing gaily.

Tata Dios came and asked San Jose what he was thinking. "Nothing," replied San Jose. But Tata Dios said; "Yes, you are. You are thinking of many things." Then he asked San Jose again what he was thinking and again San Jose replied that he was thinking of nothing. For the third time Tata Dios asked, and the third time San Jose replied, "I was wishing I could be happy as the little bird flying about here. But I have no one to talk to, no family, no children."

Then Tata Dios spread a wool blanket on the ground—so that it would be soft and clean—and ordered San Jose to lie down upon it. San Jose lay down. Then he ordered him to stand up again. This he did three times. On the third time a woman stood with San Jose. Thus did Tata Dios make woman from man. Some say from the rib.

THE CROSS MYTH

(By Lusiano)

Tata Dios was sitting up in a tall palm tree, the kind they use in making hats. Some soldiers were out hunting Tata Dios. They came to the tall palm tree in which Tata Dios was sitting, sitting right in the very top amongst the branches. The tree was extremely tall, "muy arriba," taller than you can imagine. The soldiers struck at the tree trying to cut it down, but they could not, their axes availing no more than to smooth the trunk. It was as hard as a rock.

Tata Dios called down and told them to make a cross of the wood, but they could not. They could not cut the tree.

Santo Glorio was their chief. He came and cut down the palm and it fell to earth with Tata Dios. Tata Dios and the palm broke into little pieces. Santo Glorio made the cross from the pieces. Tata Dios rose again and went off to some far away place where he is yet. He could not be killed. Santo Glorio was the eldest brother of Tata Dios.

In Loreto there is a bow with arrows, and a bayonet which is used as a "recuerdo" or symbol of the event of Santo Glorio slaying Tata Dios and making the cross. On a day in April on the "Dia de Santo Glorio" they get out the implements and use them in the ceremony. They are for that day only.

Lusiano believes that sometimes some of his people talk with Tata Dios. They have to know just how to do it. Cosme Valdez claims to know where Tata Dios is and to talk with him. Luisano thinks it true. He says the wife of Cosme says that sometimes Cosme gets up in the night and will pray and talk to Tata Dios.

TALES OF HIS FATHERS

(By Juan Campa)

There was a fiesta. They ordered La Señora to bring in a little boy to the dancing place. La Señora of Tata Dios, who is the mother of us all. She brought in a child to the dancing place. This, they then ordered La Señora, is to be killed, cooked, cut up into small pieces, and given to the people (at the fiesta).

"But no," said La Señora. And she took the child away and returned with two lambs. "We will not kill the child for the people to eat. That would make devils of them. We will kill these two little lambs and give of them to eat. Then all will be well."

So that is what was done and ever since the Warihios have eaten sheep in the tuwuris.

FIGHTING DAYS

(By Juan Campa)

In the early days the Warihios fought much amongst themselves, "mucho garambuyo, donde quiere;" there was much fighting. Brother killed brother or father, and nothing much was done or thought about it.

Then they appointed a chief (governador) who ruled the wild people and stopped them from fighting among themselves. That was long ago, uh-ha, long before the year of the cholera.

HISTORY OF TUWURI

(By Juan Campa)

First, in the very beginning of tuwuri, before they made tuwuri as they do now, they gathered around a stone; a large round boulder. Upon this boulder they beat with small stones until the large boulder began to sing. Then they danced to the singing of the rock. This boulder may still be seen aside an old trail, running from Salitral to Macoyahui. Another similar stone is near Carimechi. Upon both of them may be seen the marks where the smaller stones were beat upon them.

Then after that period there came a time when the men began to sing.

The third thing they did was to tie an old beast or two near the stone they had carried in.

Then at last there came Santa Cruz and they put up the cross, which they dance before to this day.

"And all, all of these things happened before me. I never saw them. They are the things the old ones told me, and who are all dead now."

SONGS OF JUAN CAMPA

High upon the mountain
The morning sun is striking.

Kaweyo tepayo kawikuya
Taenani mehile nopeali
Kaweyo tepayo kawikuya
Taenani mehila nopeali.
Meheleno meheleno peyaleno
Huhuwuli huhuwuli chanimane
Kawiyana kawiyana chanimane.

Dance tuwuri

SONG OF EMILIANO BOURBON

I sing tuwuri

Tutuwuri tutuwuri chanimane
Melene' melene' chanimane

Dance, little ones, dance

Tanirachi tanirachi tuwuri vum.

METAMORPHOSIS IN ANIMALS

Emiliano Bourbon and Juan Campa stated that animals change form:

The crawfish to the scorpion
Fish to muskrats
Leeches to centipedes.

Licha Acuña stated:

Mice become bats.

THE CARBUNCO (By Juan Argüelles)

The Carbunco is a small, haired animal, slightly smaller than a house cat, which carries a light in its forehead. There are very few and they come forth from their ground lairs only at night. The light they carry is presumably to enable them to see their prey. It is like a blue stone and emits a bright white light. They are very wild and will run if one approaches, and they will immediately extinguish the light which betrays them and one is unable to follow them. They live in the rocks and just beyond Chorihoa a few have been known to come forth in "las aguas."

THE STORY OF JUAN ANTONIO CHAPAPOA (By Juan Argüelles)

Juan Antonio Chapapoa was a bad Indian, Warihio. When he was a young man he worked peacefully and industriously in the fields

about Chorihoa. None there took him for other than he appeared—a good Indian, “muy bueno por trabajos.”

But at times Chapapoa would take trips up country presumably to visit his relatives. He went up the Arroyo Guajaráy, but also he went beyond as far as Nuri. There he stole horses, mules, cows, and whatever else he could. These he drove towards the lonely sierras to a barranca near Baniri near the head waters of the Arroyo Guajaráy.

Once men from Nuri trailed him and found this canyon with much stolen stock. There also they found Chapapoa camping among some large rocks. The men were armed with guns and sought to take or kill Chapapoa. They fired their guns at him as the bad Indian charged down amongst them, his great machete flying in his hand. He cut off their hands and they all died.

Then he returned again to work peacefully about the old river-split town of Chorihoa, none suspecting him of any crime. But one day a man from Nuri visited Juan Argüelles and saw this Indian working for Juan. Thereupon he told Juan who this Indian really was and what he had done around Nuri. It was then generally known that this Indian had killed many people.

“Si, said Don Juan, “Juan Antonio Chapapoa era un muy malo Indio,” but he lived to be very old. Now he is dead.

SOCIAL CUSTOMS, CEREMONIAL GROUPS, AND EXTRANEOUS INFLUENCES

It is said that when one Warihio family wished to visit a neighbor, which was seldom, the husband went first by a half hour or so. The greeting was stoical, brief, often without apparent expression of welcome. The host perhaps squatting on a chunk of wood answered the “yos kwida” with “kaniri” or kaniri va’.” The two men did not face each other; the host extended his hand as he looked off in another direction, while the visitor sat down to stare into his own space. They sat thus possibly for several minutes or a half hour until eventually talk got under way. Since the handshake is European, it is likely the original custom of greeting was different or simpler. It suggests that recorded by Lumholtz (1902) for the Tarahumare. Even today there is generally a strong reserve in greeting and rarely none at all. They usually respond either to the Spanish address or to “yos kwida” (from “Dios cuida,” may God care for you). Friends or intimates may employ a modification of the Spanish “embraso” by touching first the right shoulder with the right hand and then lightly the hands—a unique type of greeting widely practiced in the hinterlands of the west coast of Mexico. In approaching a house the writer was commonly ignored or eluded by the women.

A fisherman youth at Conejos slipped away into the "monte" when the writer was trying to converse with him. Another youth was discovered hiding back of a stone fence while we were traveling through a gate with the pack train.

They are a solitary and unsocial people. The writer knows of no others less social or who have or pretend to have so little in common with one another. A son or daughter may return to visit his or her paternal home; rarely will neighbor visit neighbor. The Indians of the locality of Guasaremos do not know the Indians of the Rio Mayo settlements, a day's journey distant. There is a dialectic difference in speech between the two and each group regards itself with some difference from the other, though they all regard themselves, apparently vaguely, as Warihios.

The following sketch of a Warihio penned in Guasaremos provides a character sketch of one of the ruder or more primitive types.

In Tiruta there lives Vicente Guireña, who, they say, is expedient at climbing cliffs in the search and gather of honey from the nests of wild bees. He will mount by the slightest holds up rocks and cliffs high to indefiniteness, without the slightest fear. He has arrived at the fiesta with a dress coat on, the only one to be seen in this country, which is altogether incongruous to his savage appearance. His hair is long, uncut, and apparently uncombed. He sits off alone on a rock, not yet venturing to join companions. Later, in the morning, he will dance pascola. Dirty, uncouth sort of person, thoroughly Indian; of staring eye, stoic poise, flaccid face, a torpid animate engine of resistance; resists hunger, cold, heat, passion?, laughter, thought, and all such difficult nuances of change. Man brute lingering in a long dawn.

He lived with his wife for a while last winter in Guasaremos. They lived under the hospitable edge of a granite boulder as large as a house, apparently resting safely and comfortable upon a hillside. He contracted with Bartolo to clear a small tract of valley land of weeds; part of the playa choked with *Cyperus* rush. He worked at this in his own way for a month or more, assiduously and faithfully cleaning perhaps 3 or 4 square yards a day, about 2 hours' work. He would work a while then lie back upon the ground and doze, then another little while and another doze. After that it was too late in the day to work so he returned to the shelter of his rock to eat a bite and sun-sit out, like a ground perching buzzard, the rest of the day.

The Warihio have no tribal unity nor conception as such. They are just a group of people occupying a certain geographical position, broken into many small groups but all speaking variably the same tongue, living on about the same subsistence pattern, and perpetuating similar customs. Our involuntary subconscious conception of them as one definite distinct people, would probably strike their minds with surprise, were the concept offered them. The Warihio of Loreto and near Guasaremos regard one ancient, Nicolas, as being chief of all the Warihio. Not all among them knew his name, only having heard that

such a one lived near Loreto, while it is doubtful if some of the river groups have heard of him at all.

Mainly through *tuwuri* are they all held to something near a common consciousness and general cultural pattern. It draws the people together in thought, play, song, and story. But even its uniting power is limited. The Warihio of Guasaremos only seldom visit the *tuwuris* of their relatively near neighbors in Platonita 2 leagues away and rarely if ever go farther below. Nor do those of Platonita often go to Guasaremos. This may in part be simply social preference. There is, however, a regular ceremonial interchange between Mesquite, Saguacoa, and Guasaremos, each about 1 league distant from the other. Aside from any innate shyness the Indian may have, distance and *tuwuri* frequently impose a natural limitation on the number of *tuwuris* he can visit. There are natural physical factors tending to form ceremonial social units within the Warihio area. Using actual observations of the terrain and people together with their reports, we can draw in roughly the areas showing this ceremonial grouping (see fig. 16, p. 127).

The ovals overlap and so do the respective cultures. Correlated with these ceremonial groups we also find: certain dialectic differences between the Guajaráy Rio Mayo group and the Loreto-Guasaremos group; a strong infusion of Mayo traits among the Guajaráy-Rio Mayo as against the preponderance of Tarahumare traits in the Loreto-Guasaremos set; and several cultural elements shared only or feebly by part of the groups. These latter may be due to geographic conditions, as bean cultivation and the mountain variety of maize, which do poorly or fail in the lowlands. For appraisal purposes it will be handy to list these singular traits, provided that, recognizing our incomplete knowledge, we use them with caution. Too little of the Chínipa group is known to enter anything here (table 2). Doubtless they would show affinity with the Loreto-Guasaremos group.

TABLE 2.—*Endemic traits correlated with group ceremonialism*

Endemic trait	Mayo side, Guajaray- Rio Mayo	Upper Mayo	Tarahumare side, Loreto- Guasaremos
Highland maize.....	-----	-----	×
Beans.....	-----	In part.....	×
Job's tears.....	-----	?.....	×
Tesguino.....	-----	-----	×
Mud-wattle.....	-----	-----	×
Flat roof.....	×	×	×
Sonovori.....	×	?	×
Back-cover and breech-clout.....	×	In part.....	×
Sling.....	×	-----	-----
Regular fishing.....	×	In part.....	-----
Chiefs or civil officers.....	-----	-----	×
Religious recitation.....	-----	?	×
Rasping stick.....	×	-----	-----
Gourd drum in water.....	×	-----	-----
Deer dance.....	×	-----	-----

The area lacking the mud-wattle is Loreto in a region of high altitude, where the more severe climate is best controlled by the stone and mortar type of wall, shown in the place of Pedro, plate 37, *a*. While the list is short, it suffices to show that field researches, aimed at determining the group differences, could do much to throw light on these ceremonial groups, and in addition show the relative impact of Mayo, Tarahumare, and Mexican culture upon the Warihio.

The presence of the Mexican rancher is now the most aggressive change the Warihio has to meet. Certain phenomena are indicative of a slow reciprocation of cultures. While the Spanish tongue has dominated, and most of the Indians have learned a simple use of it, the Mexicans in the area have adopted certain Warihio terms: "batari," the name of a fermented drink of the wild Agaves, "capido" for "kapiiah," the name of a root, the names of many other plants, and the names of localities. The Mexicans learn weaving of baskets and other objects from the Warihios. There are a few Mexicans who plant the cultivated sauwi (*Panicum sonorum*), and weywi (*Amaranthus hybridus*) of the Warihio. The Mexicans attend, dance, and even sing in the Warihio tuwuris, while the Warihios in turn play the violin and harp of the Mexicans. In Guasaremos, Bartolo, a Mexican, induced Lusiano, a Warihio, with a generous gift of maize, to hold a fiesta, making supplication for rain. The great preponderance of culture exchange, however, flows to the Warihios from the Mexicans as carriers of the aggressive European culture, elements of which can be picked out through the pages of these notes.

This exchange has done a great deal to modify the Warihio pattern and, especially in the mental culture, the disintegration is still going on. This is well illustrated in the following note written in Guasaremos.

Cosme Valdez is propagandizing for food. He is the selyeme. He tells his Warihios to slaughter goats and make tuwuri. For, says he, a "chubasco" (wind and rain storm which sometimes razes roofs and damages corn) is coming larger than the one before, but if they hold tuwuris its force will be less. He has talked with Tata Dios and that is what Tata Dios told him and instructed that the people should do.

This he spoke in Saguacoa. Isador heard him and imparted the message to Bartolo. Many of the Warihios believe him. Two tuwuris have been held (rather early) in the last few days. Isador is somewhat of a Warihio infidel and does not make tuwuris, though he sings in them. To Bartolo, he called Cosme a liar and said such talk was Cosme's way of getting his belly full for nothing. Cosme's contrariness towards labor is well known. Part of Isador's opinion may proceed from that of Bartolo, who gave the information to me. Thus we see clearly begun here the dissolution of Warihio ways, as it encounters the ridicule and skepticisms of the Mexican rancher.

The rate of culture disintegration is at present slow in the distant barrancas. It depends upon the amount of contact of the Warihio

with the foreign Mexicans. In the lowland towns, as San Bernardo, Macoyahui, and Chorihoa, the culture hangs spent and dying, a tattered remnant, being surely engulfed in the newer, stronger general Mexican culture. Even the Warihios there may not know their own blood and have forgotten their own ancestral name. With the Warihios in the isolated canyons it is a little different story, for they occupy a place very few others want, and it is likely they will hold on for an indefinite period, especially if they keep up *tuwuri*.

SUMMARY AND CONCLUSIONS

This is the first ethnographic report to be made of the Warihio Indians. Until Dr. Sauer and Dr. Kroeber contacted them in 1930, the Warihio had remained almost unknown and presumably extinct. Other references to them have been based on indirect allusions in historic sources as exemplified in Thomas and Swanton (1911, p. 9). In the field of indigenous Mexican culture they have been one of the many balls of obscurity to be kicked back and forth by various teams of historians and anthropologists. They have been considered variously as: a distinct tribe, a subtribe of the Tarahumare, as only Tarahumare, as related to the Guasapares, as synonymous with the Chínipa, and as a subtribe of the Mayo or Yaqui. Their actual place in the Mexican sun has never been known. This is true also of many other peoples reported to inhabit what Sauer (1934) designates as, "The Mountain Margins of the Fuerte and Mayo Rivers"—the Chínipas, Guasapares, Conicari, Macoyahui, Tepahue, the Baciroans, Huities, and Hios (Harihios?). Do these names represent only townsmen, or tribes, or exogamous clans as suggested by Sauer?

In view of the foregoing notes, the identity and relationships of the Warihio can more accurately be determined. Kroeber (1934, p. 13) on the basis of language relates them with the Tarahumare, but suggests that they are nearer the ancestral source of the Cáhitan group, and thus linguistically predate the Tarahumare. Certainly the present differences in language indicate two peoples who have long lived distinctly in a tribal sense.

While Warihio material culture as a whole rings very true to the Cáhitan, their social culture, particularly the *tuwuri* institution, relates them quite definitely with the Tarahumare. There appear to be more culture traits common to Warihio and Tarahumare, than to Warihio and Mayo. However, a present-day field study of the Mayo would probably reduce this difference, especially in material culture. Also there should be considered the diffusion of Tarahumare traits to the Warihio in more recent times, such as the sermons, civil officers,

and various elements of ceremony, inferred to be new to the Warihio since only the adjacent Guasaremos-Loreto group have them. But even with these deductive allowances the Warihio-Tarahumare ceremonialism remains spectacularly close and the basic pattern of *tuwuri* or *dutuwuri*, an ancient and common heritage. It appears to be less perverted by Catholicism and generally more incipient among the *barranca* Warihio along the Rio Mayo.

Beals (1932 a, p. 99) doubts that the prehispanic Tarahumare had maize, but Bennett and Zingg (1935, p. 356) express an opposite view in their historical hypothesis. The large cornless area bounding them on the east, the questionable Tepehuanes on the south, and the most probable lack of maize among the Warihio would argue, because of their very isolation, for a prehispanic Tarahumare without maize. Historically, on this tentative basis, they would join the Warihios and possibly also the Macoyahuis and Guasapares as part of a large group of hunting and gathering peoples. The Warihios at the best could only have been subagricultural. The whole *barrancan*, *montane*, and *piedmont* peoples of this western Sierra Madre area would always have been, because of the broken terrain, more or less isolated into groups, which, diversely affected by adjacent influences, could easily with time have developed local differences of customs and speech. This disjunctive condition might well be reflected in the confusion regarding these people so apparent in the early allusions to them.

On the whole, however, the basic pattern of their way of life must have been fairly uniform and static. The Mayo-Yaqui groups, with whom they had contact on the west, were quite surely at least subagriculturalists. Yet it took the full impact of the rising tide of modern Mexican culture to carry maize to the timid, stubborn *barranca* Warihio.

The early culture exchanges between the Warihio-Tarahumare and the Mayo-Yaqui are not clear. The presence of abalone among the Tarahumare indicates some trade across the Warihio area. The more prevalent adoption of the lowland *pascola* and deer dance among the Tarahumare than among the Warihio is hard to explain at first glance. Geographically the Mayo are contacted by the Warihio, in whom, hence, we should expect these elements to be best developed. However, the trail to Chínipas, which very early became a mining center, provided a direct contact for the Tarahumare with the Mayo, both tribes very likely having been requisitioned by the Spaniards for work in the Chínipas area. All the while the Warihios in the Rio Mayo *barrancas* remained in the backwater of this travel and commerce. Those who lived along the trail to Chínipas have vanished as a distinct cultural entity, although it is

Warihio habitat and many of the natives show clearly Warihio physical characteristics. To the last man in Mexico we discern traces of the cultural reverberations of the guns of Cortes.

One of the most significant things developing from Warihio investigations is the fertility of the field for the well-trained ethnologist who can live with the discomforts of travel and life in the barranca wilderness. This is true not only for the Warihio, but also for all the back parts of the states of Sonora, Chihuahua, Durango, and Sinaloa. Early traits and relationships can still be ferreted out as illustrated in:

1. The memorial knowledge of cannibalism and human sacrifice among the Warihio.
2. A prehispanic culture still plainly discernible and still largely active among the Warihio.
3. The presence of mythology among the Warihio and a voluminous expression of it in Sinaloa.
4. Rain ceremonies, survivalistic, and the beating of tin pans during an eclipse by the Spanish-speaking natives of Guirocoba, Sonora.
5. The writer's observation of decorated trees, occurring apparently at random through southern Sonora.
6. Tribal residues occurring as backward peoples in many hinterland corners.

Precious little remains of indigenous culture in northwestern Mexico, but it is more than has been generally suspected. Much of it will flicker out in our present generation with the advance of the machine, upon which rides the modern Mexican exploiter, hotly spurring, like his northern neighbor. Roads one by one creep back into the interior for the trucks to contact more efficiently the virginal resources. In minerals and woods the Barranca region (Gentry, 1942 a, b) is one of the last great frontiers of Mexico. Our ethnographic field wanes not from too much desk work, but from too little living with the great unwritten source book.

REFERENCES

ALMADA, FRANCISCO R.

1937. Apuntes historicas sobre la region de Chinipas. Chihuahua.

BANNON, JOHN F., S. J.

1939. The conquest of the Chinipas. Mid-America, No. 21.

BEALS, RALPH L.

1932 a. Aboriginal survivals in Mayo culture. Amer. Anthrop., n.s., vol. 34, No. 1, pp. 28-39.

1932 b. Comparative ethnology of Northern Mexico before 1750. Ibero-Americana, No. 2. Univ. California, Berkeley.

BEALS, RALPH L.; TAX, Sol; and REDFIELD, ROBERT.

1943. Anthropological research problems with reference to contemporary peoples of Mexico and Guatemala. Amer. Anthrop., vol. 45, No. 1.

BENNETT, WENDELL CLARK; and ZINGG, ROBERT MOWEY.

1935. The Tarahumara, an Indian tribe of northern Mexico. Univ. Chicago, Chicago.

BURT, W. H.

1938. Mammals of Sonora. (Faunal relationships and geographic distribution.) Univ. Michigan Misc. Publ. No. 39.

CASTETTER, E. F.; BELL, W. H.; GROVE, A. R.

1938. Early utilization and distribution of Agave in American Southwest. Univ. New Mexico, Biol. Ser., vol. 5, No. 4.

DECORME, GERARDO, S. J.

1941. La obra de las Jesuitas Mexicanas durante la Epoca Colonial, 1572-1767. Vol. 2. Mexico.

DUNNE, PETER M., S. J.

1941. Tomas de Guadalajara: missionary of the Tarahumara. Mid-America, No. 23.

1948. Early Jesuit missions in Tarahumara. Univ. California, Berkeley.

GENTRY, HOWARD SCOTT.

- 1942 a. Rio Mayo plants. Carnegie Inst. Publ. No. 527.

- 1942 b. Caminos of San Bernardo. Michigan Quart. Rev., pp. 152-157.

HOLDEN, W. C., ET AL.

1936. Studies of the Yaqui Indians. Texas Tech. Coll. Bull., vol. 12, No. 1.

HOVEY, E. O.

1905. Western Sierra Madre of the State of Chihuahua. Amer. Geog. Soc. Bull. No. 37.

KROEBER, A. L.

1934. Uto-Aztecan languages of Mexico. Ibero-Americana, No. 8.

LUMHOLTZ, CARL.

1902. Unknown Mexico. Vols. 1 and 2. New York.

OCARANZA, FERNANDO.

1937. Cronicas y relaciones del occidente de Mexico. Mexico.

1942. Parva cronica de la Sierra Madre y las Pimerías. Mexico.

PASSIN, HERBERT.

- 1944 a. A note on the present indigenous population of Chihuahua. Amer. Anthropol., n.s., vol. 46, No. 1, pp. 145-147.

- 1944 b. Some relationships in Northwest Mexican kinship systems. El Mexico Antiguo, vol. 6, Nos. 7-8.

SAUER, CARL.

1934. The distribution of aboriginal tribes and languages in Northwestern Mexico. Ibero-Americana, No. 5.

1935. Aboriginal population of Northwestern Mexico. Ibero-Americana, No. 10.

SHREVE, FORREST.

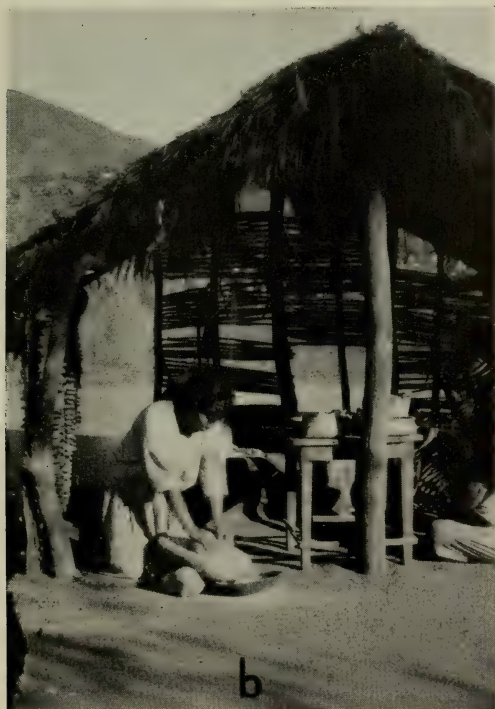
1934. Vegetation of the northwestern coast of Mexico. Torrey Bot. Club Bull., vol. 61, No. 7, pp. 373-380.

STANDLEY, PAUL C.

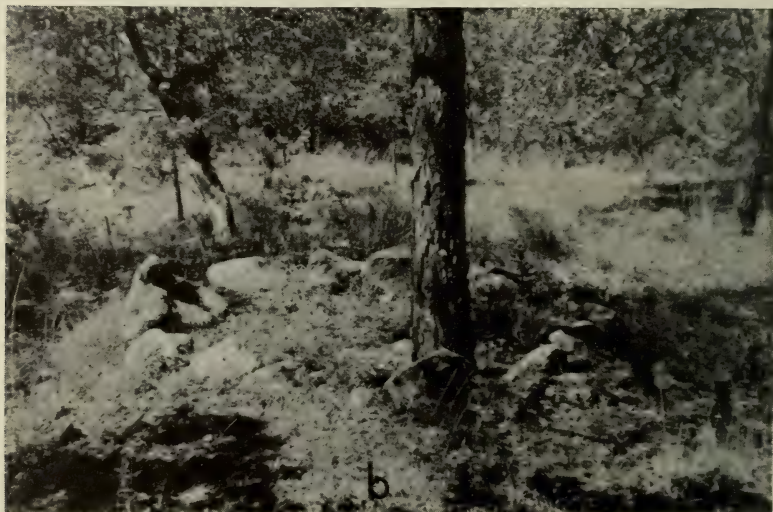
- 1920-26. Trees and shrubs of Mexico. Contr. U.S. Nat. Herb., vol. 23.

THOMAS, CYRUS, and SWANTON, JOHN R.

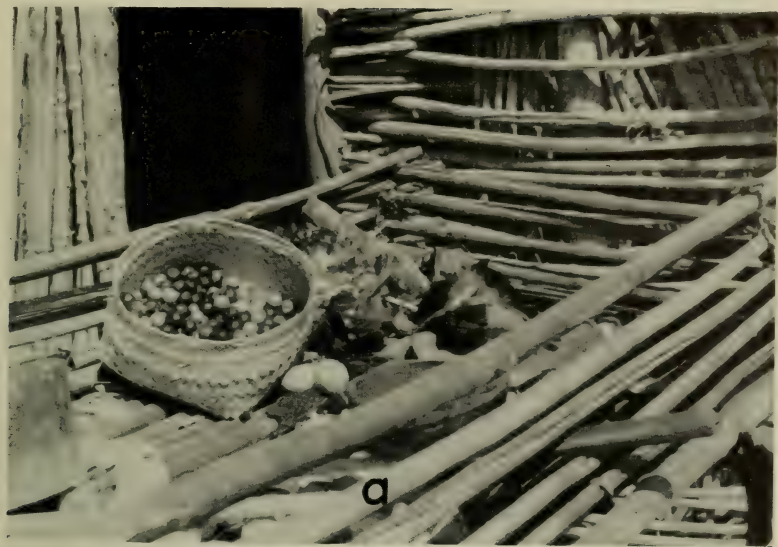
1911. Indian languages of Mexico and Central America. Bur. Amer. Ethnol. Bull. 44.



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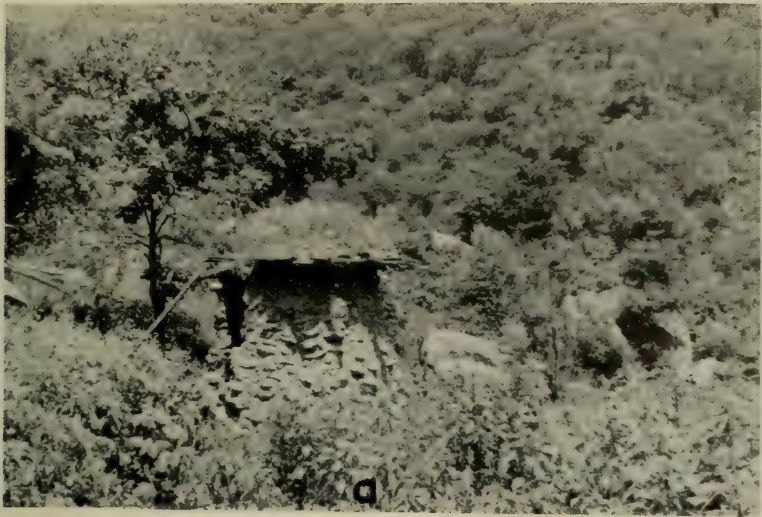
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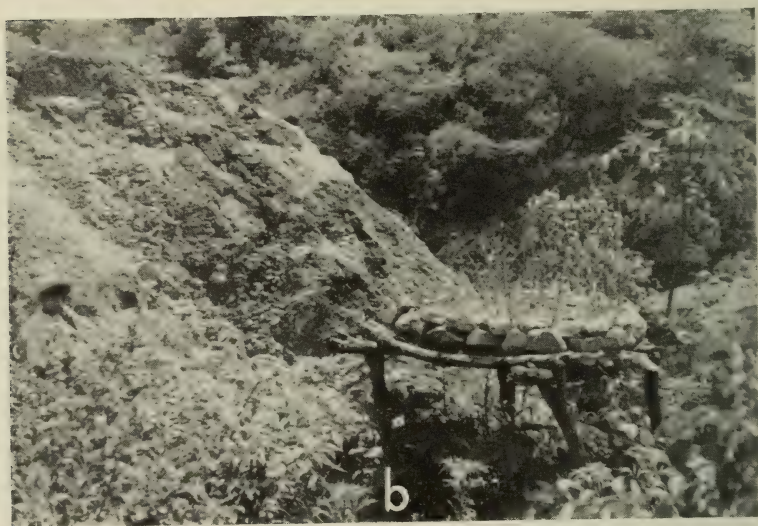
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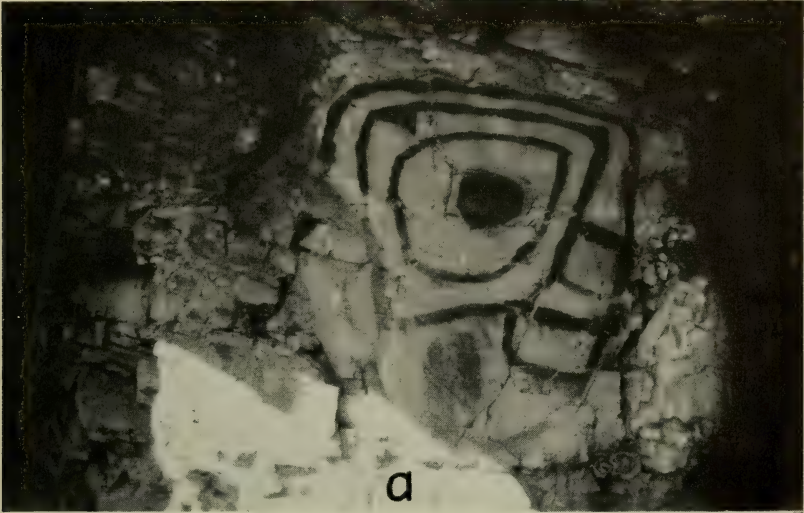
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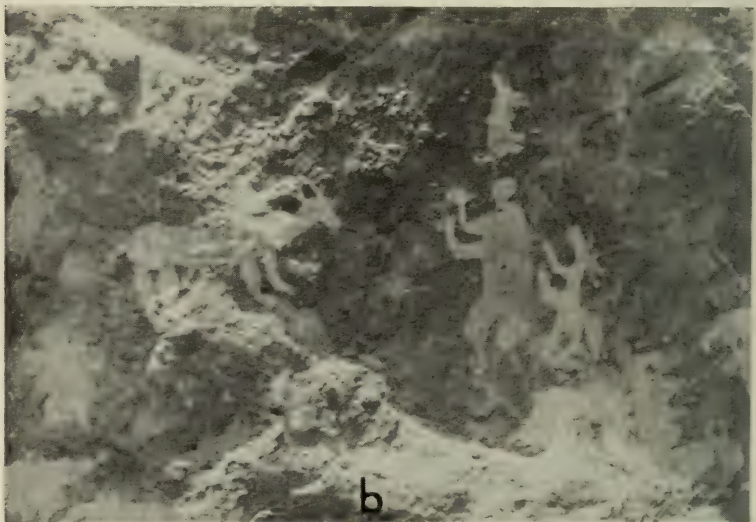
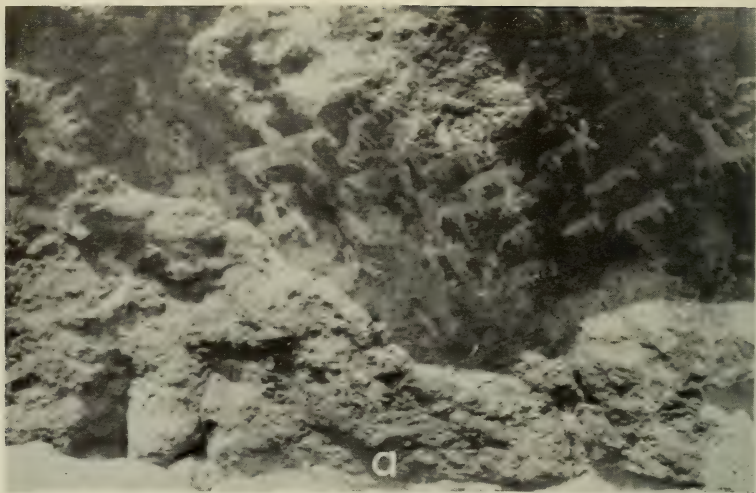
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THE YAQUI DEER DANCE: A STUDY IN CULTURAL
CHANGE

By CARLETON STAFFORD WILDER

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THE YAQUI DEER DANCE: A STUDY IN CULTURAL CHANGE

BY CARLETON S. WILDER

INTRODUCTION

This is a study of an aspect of Yaqui ceremonial life as observed in 1939-40 in Pascua, a settlement founded in Arizona by immigrant Yaquis from the tribal homeland in Sonora, Mexico.¹

The deer dance was reported by Spicer as having been omitted during 1936-37 from many ceremonies at which it might have been held. Accounts of older Arizona Yaquis also indicated that the deer dance was losing elements of form and meaning. It was suggested that the position of the deer dance represented an adjustment of the culture of Pascua to a condition of decreased importance of the natural environment in Yaqui life. The conclusion was that the deer dance and its animal associations were no longer relevant to the economic life or to any other aspect of life in Pascua (Spicer, E. H., 1940 b).

The present study is an attempt to describe the form of the deer dance in Pascua in 1940 and the meanings still attached to it, to seek explanation of the causes related to the persistence of these meanings, and to inquire into the function of the deer dance in Yaqui culture of Pascua of the period.

I wish to acknowledge my great indebtedness to Dr. and Mrs. Edward H. Spicer, both of whom have generously put at my disposal the results of their studies in Pascua.

I also wish to thank Dr. Emil W. Haury for making available funds and study collections of the Arizona State Museum, Prof. William Kurath for critical advice concerning the presentation of linguistic material, Mr. and Mrs. Jean B. Johnson for their assistance with Yaqui grammar, and Mr. David J. Jones and Mr. Donald J. Lehmer for photographic material.

METHODS

Material was gathered with reference to a specific problem, but interpretation was made in terms of the whole context of Yaqui society

¹ In "Pascua, A Yaqui Village in Arizona," a description of pertinent historical information will be found, as well as a description and analysis of Arizona Yaqui culture and social organization of the period (Spicer, E. H., 1940 b).

and culture as observed in 1940. Several modes of attack were utilized:

1. An examination of available material, primarily the field notes and manuscript material of E. H. and R. B. Spicer, as a basis for understanding the problem in relation to other aspects of Yaqui culture.

2. An examination of available ethnographic material concerning selected tribes in the Southwest and in northern Mexico in order to establish the probable nature of aboriginal Yaqui religion.

3. The collection of material concerning the form of the deer dance. This included, besides descriptions of the dance and material culture aspects of the dance, the collection of a series of songs used in the performance. Inasmuch as the problem was to be an interpretation of culture in Pascua, the information was gathered there.

4. Interpretation and observation. This included interviews with certain types of individuals in Pascua for native attitudes concerning the dance as well as study of historical material. Observation was directed especially toward overt expressions of the relationship of the deer dance in Pascua to other ceremonial aspects of Yaqui culture.

5. A 2-day trip was made to Vicam Estación, Vicam Viejo, and Potam pueblos in the Rio Yaqui area. Portions of two deer dances were witnessed in Vicam Viejo. A complete dance was observed also at Guadalupe village near Phoenix, Ariz., and a portion of a deer dance was observed in Barrio Libre, near Tucson.

The material which presented the most difficulties in collecting was the deer songs. It was essential to the solution of the problem that the deer songs be collected in the form in which they are customarily sung, and in the order in which they occur in the dance.² The following procedure was followed in collecting the songs:

1. Four deer singers (*masobwikame*), with the musical instruments used in the dance, were taken to the recording studio of the Speech Department, University of Arizona. In one morning, 20 songs were recorded. By collecting this number it was assumed that material sufficiently representative to provide a reasonably accurate description of the form and content of the deer songs would be acquired. For the sake of clarity in the phonographic recordings, the voice of the

²Both E. H. Spicer and Jean Johnson have collected deer songs in textual form. In both cases, these songs have been spoken, and do not reflect the form of the song when sung. They are essentially rationalizations, in Yaqui, of the deer songs. Valuable as these native interpretations are, my interest was in the formal presentation of the songs as well as in the meaning, as the form itself has meaning in reference to the dance and the concept of the dance. Stress accent in Yaqui shifts depending on context and has therefore not been indicated except in the transcription of the mechanically recorded texts of the deer songs (see p. 176). It may be said that in most Yaqui words there is greater stress on the first syllable although prominent exceptions occur in words adapted from Spanish.

chief deer singer was singled out, the microphone being so placed that the voices of the others and the instruments were kept in the background. Also, for the sake of economy of time and record space, each song was sung through once. The second and third repetitions which normally occur in the complete song during a dance were omitted.

2. A phonetic transcription was then made of each of the songs, from the phonographic recordings.

3. In a series of interviews, utilizing the chief deer singer (whose voice was recorded on the phonograph records), and an English-speaking, Arizona-born Yaqui informant who was not a deer singer, another phonetic transcription of the words of the songs was made. The phonograph recordings of the songs and the original transcription were constantly used during these interviews as checks on the accuracy of the informants. A translation, as literal as possible, was attempted at this time and general discussion of matters concerning the songs was encouraged in order to acquire context for further interpretation of the songs.

4. An intensive study of the songs and translations was made, using Yaqui texts, a Yaqui dictionary, and notes on grammar, all collected by the Spicers in 1936-37. Of inestimable help were the comments and short sketch of Yaqui grammar furnished by Jean Johnson.

5. A final review of the songs was made with the two informants, and several meetings were held with the English-speaking one alone. At this time, supplementary linguistic material was gathered in an attempt to clarify the meanings of the songs.

INFORMANTS

The principal informants utilized during the course of this study were:

³ Juan Silvas (Jose Angel Alvarez), 40, single, no kin in Pascua, but ceremonial sponsorship relations with Pascuans. Speaks Yaqui, Spanish, Papago (?), English (?). Is chief deer singer at present. Matachin kovanau (director) at one fiesta in 1939 in Pascua, but present ceremonial activities are limited to participation in deer dance activities.

³ Frank Acuña, 35, married, several children, kin and ceremonial relatives in Pascua. Speaks Yaqui, Spanish, English. Is member of fariseo and matachin societies, sings deer songs. Native of Arizona, educated in ranch schools. In cotton-picking season is weigh boss on a ranch. A progressive type of Yaqui who has compromised with his economic environment by living in Pascua only during the ceremonial season and spending the remainder of the year on the ranch where he is employed.

³ Informants who sang for phonograph recordings. All of them were paid for this performance.

³ Juan Alvarez (Juan Maso), the maso, or deer dancer. 40, single, supports sister and her family. Ceremonial sponsorship relations in Pascua. Yaqui-Spanish speaking. Fariseo and matachin societies. Because of his activities in fariseo and matachin organizations, he was not able to dance the deer dance at Palm Sunday and Easter, 1940. A young boy was trained to take his place.

³ Luis Robles, 30-35, married. Kin and ceremonial relatives in Pascua. Yaqui-Spanish speaking. Matachin society and deer dance singer.

Joe Dolores Romero, 20-25, married, one child. Ceremonial relatives and kin in Pascua. English, Yaqui, Spanish speaking. Caballero and matachin societies. Native of Arizona. Does not know deer songs. Aided in translation of them, together with Juan Silvas. Furnished a translation of most of the songs, which he wrote in English. (These translations are included with the deer songs as translation I.) An alert, willing, reliable informant. He was paid for formal interviews concerned with translation of the songs.

Lucas Chavez, age 60 plus. Widower, lives alone. No kin alive. No ceremonial relatives in Pascua. Reads and writes in Spanish. Speaks Yaqui. Participates as third maestro and/or temasti in church services. Formerly active in Yaqui political organization, now non-existent. Is village postmaster and mail carrier. Well versed in Yaqui-Catholic ritual as well as in aboriginal Yaqui customs and mythology. Both Spicer and Beals⁴ have relied on this informant. Probably the best general informant in Pascua.

Information was gathered from numerous other individuals through casual conversation during the course of the study. An attempt was made to gather information relative to the meaning of the deer dance to representative persons of two general age groups, those under 25 and those over that age—preferably 40 or older. Five in the latter group were contacted, and seven in the former group.

THE ETHNOGRAPHIC POSITION OF THE YAQUI

Since this study is devoted primarily to one aspect of culture—the religious—no attempt will be made to define the whole of Yaqui culture in relationship to that of its neighbors, but rather, the emphasis will be on the conceptual treatment of the deer among various groups of northern Mexico and Southwestern United States as described in published material.

As to the ethnographic position of the Yaqui, Beals states:

On the basis of greatest similarities and the general feeling of the culture of each area, in the last analysis the Cahita [Yaqui and Mayo] and the Tarahumare must be considered closest to the Southwest, while the other coast and Sierran peoples are closest to the Mexicans. [Beals, 1932 a, p. 146.]⁵

³ Informants who sang for phonograph recordings. All of them were paid for this performance.

⁴ Beals, Ralph L., University of California at Los Angeles.

⁵ This study was based on historical mention of characteristics of native peoples in Mexico. Beals has used these characteristics as culture traits and attempted a comparative analysis of the tribes of northern Mexico.

That the position of the Yaqui and Mayo is marginal is emphasized by the fact that in drawing the boundaries of the cultural provinces in northern Mexico, the Rio Yaqui constitutes the northern boundary of the Old Sinaloa Province, and the southern boundary of the Old Sonora Province (Beals, 1932 a, pp. 134-139).

The marginal nature of the Yaqui-Mayo group may best be brought out by citing the percentage figures derived by Beals, on which he has based his conclusions. The figures indicate the percentages of traits occurring mutually in the areas under consideration (*ibid.*, p. 145) :

63 percent of Old Sinaloa traits are found in the Southwest

56 percent of Old Sonora traits are found in the Southwest

59 percent of Southwest traits are found in Old Sinaloa

77 percent of Southwest traits are found in Old Sonora

Comparing percentages with Mexican cultural provinces and the provinces in which the Cahita are located, Beals notes:

The Southern Sierra region shows an unexpectedly low correlation with the Tepic-Culiacan area and Sinaloa and a surprisingly high correlation with the Sonoran province (in view of the geographical situation). The nomadic peoples show not only an understandably high relationship with the Southwest but a surprisingly high correlation with Sinaloa and Sonora as well, the relationship being closer than with the adjoining provinces, another suggestion of the intrusive nature of Cahita culture and perhaps the Cahita themselves. [*Ibid.*, p. 145.]

From all of this material, as Beals admits, few conclusions of definite nature can be made. The problem is a difficult one, as it is not a problem of defining culture areas, but rather one of defining variation in one large culture area. I would judge that Beals includes the Southwest area as it has been defined at the present as a cultural province of this larger area (*ibid.*, p. 145). Including the Southwestern area as a cultural province in the larger northern Mexico culture area, we can still find no definite line of demarcation between any of the provinces—a line such as separates the Plains area from the Southwest, or Northwest, for instance. In the absence of more detailed information concerning the cultures of not only northern Mexico, but also of the Southwest, it is safe to conclude that a basis for comparison exists between the Cahita and tribes both to the north and south of it, in the Southwest, and in Mexico as far south as the Jalisco-Tepic province.

In this discussion, comparisons will be limited primarily to the concepts concerning the deer.

Among the Huichol, considering one of the distinctly Mexican groups (which Beals has included in the southern Sierra province), the deer is an all-important mythological and religious figure. Huichol religion is essentially a system of nature worship (Zingg, 1938, p. 257).

. . . as soon as the seed corn sprouted [according to a myth], it cried like a little deer and then like a child. The mythology speaks of the deers[sic], which are killed for the parched corn ceremony for burning new corn-fields, as yielding both corn and peyote. The corn is taken from the sacred horns of the deer. One of the most interesting participations between corn and the deer is that the hungry and crying corn-children eat the deer-meat offered to the sacred god-disc in the cornfield (*ibid.*, p. 257).

More numerous than the identifications of corn with the deer, are those that identify the deer with peyote. In the first pilgrimage which was a hunt for the deer, Peyote, all the tracks of the deer were changed into peyotes. The religion requires that those little cacti be shot with an arrow as a deer is shot. This is actually done (*ibid.*, p. 258).

The importance of the deer in Huichol religion is further indicated by such features as the names of both classes of shamans, *maSa² akame*, *maSa*, 'deer' (*ibid.*, p. 206). A deer dance is given. Skins of deer are not used, although it is so commanded in mythology. The dance is one engaged in by both men and women. Its characteristic feature is the stamping of feet. The deer dance, as might be expected among the Huichol, is the same as the peyote dance (*ibid.*, pp. 400, 496). "The tail of the deer is one of its most sacred parts and is thought of as a feather to be used as a shaman's plume. It is as sacred as hawk or eagle feathers" (*ibid.*, p. 308).

Although Zingg makes no specific mention of association of the deer with flowers (it has, after all, ample floral association with corn and peyote), the conceptual treatment of flowers is considered in this discussion because of flower association of the deer among other groups, and because of their importance in Yaqui religion today (Spicer, E. H., 1940 b, e.g., pp. 254-255).

Flowers and beautiful green leaves adorn the outside altars during all ceremonies, as well as the altars of the god-houses. . . . Flowers, including a beautiful orchid, are used as a hyssop for sprinkling things and people in the Huichol baptism with sacred water . . . it is with the wet-season goddesses that flowers have the most intimate relationship. Thus they are associated with rain, growth, fertility, and increase. [Zingg, R. M., 1938, pp. 246-247].

The lack of direct association of the deer with flowers is best explained by the fact that the deer is a dry-season god (*ibid.*, p. 307), whereas flowers are primarily wet season in association.

Among the Tarahumare, native religious elements are obscured and in many instances have been replaced by the introduced Catholic elements of religion (Zingg, conversation, 1940). However, fiestas follow patterns of activity given by the supernatural, and the two dances which occur at fiestas were originally learned from animals. The *rutuburi* was taught by the turkey, and the *yumari*, traditionally the oldest dance, was learned from the deer (Lumholtz, 1902, vol. 1, p.

335). The yumari controls the sun and moon and causes them to attend the fiesta.

Among the Papago, the deer is included among those animals, birds, and insects endowed with both beneficial and harmful power. Deer sickness can be cured by the singing of deer songs, songs acquired through dreaming (Densmore, 1929, p. 90). The deer tail is important in curing and is considered as effective as those very rich offerings, eagle down and beads. Deer hunting is the most skilled of Papago crafts. Every step in the process of hunting is "given," i.e., has been acquired through supernatural contact in dreaming. The night prior to a deer hunt, songs are sung describing the deer and its habitat. Some of these songs are sung by the flowers on which the deer grazes, some by the deer itself (Underhill, 1938, pp. 53-56).

That the deer occupies a position more important than that of other animals is indicated by the position it occupies in the ceremonies of the Papago. In the Vikita, the "Prayer Stick" festival, the deer plays a conspicuous part.

Then came the first group. . . . Ahead of them walked a Sprinkler of Cornmeal, blessing the ground on which they would walk. Then came a little boy masked like the older singers and carrying a rod with a bluebird feather at the end. After him came the twelve young men, carrying a platform made of cactus ribs on which there might be a great image of a cloud or a mountain made of buckskin with small carved birds upon it; or perhaps a deer or a giant cornstalk (ibid., 1940, p. 53).

The Vikita follows another ceremony, called a deer dance by Underhill, which takes place in the autumn.

Its object was to work magic over all the crops which had been gathered and over the first deer of the season, to make them safe for eating during the winter. Hunters went out to look for the deer The deer tail was considered a magic property and was taken back . . . to be used in curing. [Ibid., p. 50.]

Among the Pueblos the information concerning the deer is not as detailed as among the Papago. At Zuni, the deer causes sickness (Parsons, 1939, p. 96). It can also cure and protect one's health. In order that a Zuni child may keep well and walk early, hairs from a deer are burned and the child held over the smoke; wax from the deer is placed in the ears of the child to give it good hearing. The Zuni believe the deer is never sick (ibid., p. 92).

The hunting of the deer receives ceremonial elaboration at Zuni also:

. . . the deer is stalked ritualistically; he is enticed with sacred esoteric songs, he is killed in prescribed manner, and when brought to the house is received as an honored guest and sent away with rich gifts to tell others of his tribe that he was well treated in his father's house. [Bunzel, 1932, p. 488.]

Control over the deer is ritualistically expressed also in the Rio Grande Pueblos. A deer dance is reported for Taos (Parsons, 1939, pp. 842-844), San Juan (Buttree, 1930, pp. 52-54; Parsons, 1939, p. 912), Cochiti (Parsons, 1939, p. 533), and Isleta (*ibid.*, 1932, p. 337).

In summary, it can be said that deer ceremonies occur throughout the combined northern Mexico-Southwestern culture area, and that these ceremonies differ according to the religious pattern of the various groups considered. In spite of the variation in the conceptual and ritual treatment of the deer in the various tribes, certain similarities are observable, and these similarities can be characterized as traits typical of this area. Since the cultures which have been considered in this comparison belong to the culture area to which the Yaquis belong, it is not improbable that the Yaqui deer ceremony has some elements in common with the deer ceremonies of the Huichol, Tarahumare, Papago, and Pueblos.

In Pascua we are dealing not only with an apparently non-Christian ceremony in a community in which the Catholic religion has obscured the aboriginal religion, but also we are dealing with a community in which the economic-geographic base is no longer that which it was formerly (or which it is today in the Rio Yaqui). As a result of this latter change, if aboriginal Yaqui religion was in part a reflection of the relationship of the Yaqui to their environment, this relationship no longer exists in Pascua today. Through comparison with other tribes of the same area, which have been affected less by change, we are able, through interpolation, to indicate some of the probable characteristics of the aboriginal deer dance in Yaqui culture.

From the material considered, it would seem that the deer is of particular importance among the Huichol, where he occupies the position of a deity. His position among the Tarahumare is not clear, apparently because of the influence of Christian religion. Among the Papago, the deer is important because of its value as a food animal and for curing. There is some indication through the accounts of its ritual treatment that other values are associated with it. The fact that in the Vikita ceremony the image may be that of either a deer or giant cornstalk may be significant. Among the Pueblos, the curative aspects of the deer concept are perhaps not as important as among the Papago; the deer ceremonies appear to be directed primarily at the control of the deer as a source of food. However, the aspects of curing and control of food supply are present among all groups considered.

In relating the Yaqui deer concept and ritual treatment of the deer to the concepts and treatments of other tribes in the area it is well to

remember that Beals has suggested that the Cahita are marginal to both the Southwestern tribes and those of Mexico. He has interpreted some of the elements of Yaqui-Mayo ceremony from this point of view (Beals, 1932 a and 1932 b; Parsons and Beals, 1934; Spicer, 1940 a). Likewise, in view of the marginal position of the Cahita, I would suggest, in inferring the nature of the aboriginal Yaqui deer dance, that not only the ritualistic treatment of the deer as found among the Pueblos and Papago be considered, but that the more deeply rooted religious significance of the deer, as found among the Huichol, be considered. In this connection, it is interesting to recall that Beals found a surprising correlation, statistically, between the culture traits of Sonora-Sinaloa (Yaqui-Mayo) and the Southern Sierra (Huichol).

THE FIESTA PATTERN IN PASCUA WITH REFERENCE TO THE DEER DANCE

In order to understand the position of the deer dance in Pascua today it is necessary to present a brief description of the religious activities of Pascua, since it is in terms of this context of ceremonial activities that we must interpret the deer dance. In this chapter we will consider the principal types of ceremonies, the principal types of ceremonial participation, and the formal expression of the relationship of the various types of ceremonial participation as expressed in the procession.⁶

The importance of ceremonial activities in Pascua is indicated by the following statement:

. . . Forty-seven percent of the days of the year from July 1936 to July 1937 were occupied with ceremony of some kind, counting every day on which there was any ceremony at any time of day or night (including the Easter season but not including limosnas). There were fifty-one days on which there were services both in the morning and evening or throughout the day, thirty-three mornings, and thirty-nine evenings. [Spicer, MS. 1939, p. 37.]

The principal ceremonies are as follows (ibid., pp. 33-44) :

Noncalendrical (household or personal) :

1. Baby funeral
2. Adult funeral
3. Novena
4. Cumpleaño
5. Fiesta de promesa
6. Baptism
7. Marriage

⁶ Spicer, R. B., 1939—the source of factual material presented in this chapter concerning activities of ceremonial participants other than that of the deer dancer. My observations were limited to the deer dancer and his formal relationship to the other participants in ceremonies as exemplified in the procession and other aspects of the fiesta.

Calendrical (church or group—impersonal) :

1. October novenas for the dead
2. May vespers for the Virgin
3. Morning service for fiesta
4. Evening service for fiesta
5. Vesper for fiesta
6. All-night fiesta
7. All-day fiesta

The noncalendrical observances are those related primarily to the individual, family, and household. The calendrical observances are those which are a matter of group concern, and as such are of a less personal nature. Celebrations of various Saints' days as well as the ceremonies of Lent are participated in by the entire group. Novenas appear under both classifications, as they are both a ceremonial manifestation of an individual household and a ceremonial concern of the entire village in the period prior to All Souls' Day, when the church formally acts in behalf of the dead of the entire village.

As might be expected, in a society in which ceremonial activities are of so much importance, participation on the part of individuals of the community tends to be organized. Expression of this organization is most common in the form of societies. Types of participants in Yaqui ceremonial activities are:

1. *Matachinis*.—A dance society, the members of which serve for life. Membership is determined through promise made to cure illness. The individual may promise himself, or his obligation to dance may be the result of promise made by members of his family at the time of his illness. Frequently, such promises are made during childhood, the individual participating actively as soon as he has reached a reasonable age. There is no age limit; participation may begin as early as five years. Membership is restricted to males. Patroness of this society is the Virgin Mary.

Membership may be acquired merely through the desire to dance, the most important function of this group. Unmarried members are expected to be much more faithful in fulfilling their duty by dancing than are married ones. Approximately seventy members in Pascua in 1936-37 (Spicer, MS. 1939, p. 18).

2. *Fariseos*.—A society which is dominant during Lent, supplanting the *matachinis* almost entirely during this time. Dancing is infrequent, and can be considered one of the less important activities of this group. Unlike the *matachinis*, this group functions as a police organization and is in effective control of village activities during the Lenten season. Membership may be by capture, i.e., eating with the members of the group, and because of misconduct of various sorts. Most members are acquired, however, through promise, as is true with the *matachinis*. Membership is for life. Participation in the activities of the *fariseos* takes precedence over participation with the *matachinis*, if a man is a member of both. The lower age limit appears to be about seven or eight years, as the duties of this group are much more arduous than those of the *matachinis*. The patron of this society is Jesus Cristo.

3. *Maestros*.—Currently there are five maestros in Pascua. Although not as closely organized as the above groups, the maestro group functions essen-

tially as a society. The maestros are leaders of the church services and it is up to them, or the maestro mayor, specifically, to see that services are held on the proper days, and that the church services in connection with private fiestas are conducted. Membership is through ability and desire to become a maestro, and also through promise to Jesus Cristo. All deities of the Christian religion are served by the members of this group.

4. *temastim*.—Closely allied to the maestros are the *temastim*, who serve as sacristans. They may be promised, or serve through choice. The duties of the *temastim* may be properly performed by a maestro, and a *temasti* may, upon mastery of the ritual (and having the ability to read) serve as a maestro. This is a male organization.

5. *kopariam* or *cantoras*.—A society of women who serve with the maestros as a group directly connected with the altar. They serve either through desire or vow. Their chief function is singing of chants in support of the maestros. If serving under vow, their patron is Jesus Cristo.

6. *kiostim*.—Group which takes care of the images and altar paraphernalia. The duties of this position may be fulfilled through vow to the Virgin.

7. *alpesim*.—Young girls, fulfilling a vow through service, working with the altar group.

8. *tenancim*.—Women, who through voluntary and temporary service, not through vow, carry the images of the Virgin in the various processions.

9. *Caballeros*.—Male group in the service of the Virgin of Guadalupe. They are closely identified in activities with the *fariseos* and their original function apparently was to serve as a check on the activities of the *fariseos* (whose ritualistic activities are in opposition to those of the Church). Service is through vow.

10. *Coyotes*.—These are the ritualistic manifestation of the warrior society. This group is of little importance in Pascua. Its members did not formally appear in 1936-37 at the time of the Spicers' study, but an attempted revival was observed during the past two years. The few members present in Pascua are old men, and the group suffers from lack of organization and a leader. In certain processions this group acts as an escort for the image of Christ. In others it has carried an image of the Virgin of Guadalupe.

11. *Pascolas*.—Important ceremonial roles are played by the *Pascolas*. They differ from those mentioned before, however, in that they are not organized in a society, but must be classed as individual participants in ceremonies. They function as ritualistic hosts at fiestas. Dancing is an important duty performed by them, but is not the only one. They do not serve through vow, although frequently, through rationalization, an attempt is made to link the *pascolas* with the church groups by identifying them as serving for Jesus Cristo.

12. *Maso*.—The deer, or deer dancer, is closely associated with the *pascolas*. Like them, he is not dedicated to perform for a deity, is not a member of an organization or society, and unlike the case of the *pascolas*, no attempt is made, through rationalization, to equate the *maso* with the Christian religion.

It is important to note in what formal respects the activities of the *maso* differ from the other types of ceremonial activities.

The majority of ceremonial participants in Pascua belong to an organized group, or society. The *maso* shares the individualistic characteristic of his role with but one other type of participant—the *pascola*.

TABLE 1.—*Comparison of ceremonial groups*

	Matachinis	Fariseos	Maestro-Cantora	Pascola	Maso
How organized.....	Society.....	Society.....	Society.....	Individual.....	Individual.
Patron deity.....	Virgin.....	Jesus.....	All deities.....	None.....	None.
Promised?.....	Yes.....	Yes.....	Yes.....	No.....	No.
Affiliated with church?	Yes.....	Yes.....	Yes.....	No.....	No.
Ritually associated with church?	Yes.....	No.....	Yes.....	No.....	No.
Importance of dancing.	Important.....	Occasional.....		Important.....	Important.
Dance native or Spanish.	Spanish.....	Native(?).....		Both.....	Native.
Activities other than dancing?	Yes.....	Yes.....		Yes.....	No.
Types of appearances:					
a. Seasonal.....	Except Lent.....	Lent.....	All year.....	All year.....	All year.
b. Ceremonial.....	Church services Saints' Days, Cumpleanos, Fiestas de promesa, Palm Sunday, Easter.	All ceremonies in Lent. At funerals of members throughout the year.	All ceremonies.	Children's funerals, Cumpleanos, Fiestas de promesa, Palm Sunday, Easter, Saints' Days.	One Saint's Day, Cumpleano (one), Fiesta de promesa (one), Palm Sunday, Easter.

The majority of participants take part in ceremonial activities because of a promise made to a deity. The maso and pascola are again distinct from the other participants in that they are not promised.

As opposed to the types of activities which are ritually associated with the church, the maso, together with the pascolas and fariseos, are non-church, or household, in ritual association.

The ritual importance of dancing is apparent in one type of church activity, that of the matachinis. (Dancing cannot be considered one of the more important aspects of fariseo participation.) The maso and pascolas have ritually important dances.

There seems to be no seasonal association of the deer dance, something again shared only with the pascolas. But as for frequency, the deer dance occupies a position by itself, rivaled in this respect only by the almost extinct coyote society dance.

The functional interrelation of various types of ceremonial activity is very clearly expressed formally in the procession, a feature of certain of the household fiestas. The procession is an important characteristic of the larger, pueblo fiestas also, but can be considered an elaboration of the basic household type of fiesta. The sequence of events in a household fiesta follows this order:

1. The fiesta starts as a private observance by the members of the household.
2. The fiesta is opened to the public in the afternoon following its start.
3. About sundown (the actual time varies greatly), the church officially enters the fiesta, the church participants coming from the church in formal procession to the household ramada where the fiesta is being given.
4. A ceremony of greeting is carried on by the householders and household participants upon arrival of the procession from the church. The householders

escort the church groups and their images to the household ramada, where for the remainder of the fiesta the village church and images are established.

5. Church services are carried on through the night in the sacred part of the household ramada, while food and entertainment are provided for the entire group of participants and spectators by the fiesteros and their representatives. The entertainment is in the form of pascola activity in the profane⁷ part of the ramada. For the most part the pascola activities are not synchronized with the activities of the sacred side of the ramada.

6. In the morning, usually around 10 o'clock, the church group leaves, signifying the closing of the fiesta. A procession occurs again, it being essentially the reverse of the ceremonial arrival of the church group the evening before. Prior to leaving the household fiesta, a formal expression of gratitude and thanks to the various participants is made. This is immediately followed by the departure of the procession to the church, taking with it the images and paraphernalia of the church.

It is in the greeting of the church group, and the escorting of the images into the household ramada that we are most interested, as in this part of the procession the maso, if he is present, takes part. With the arrival of the matachinis who accompany the images of the Virgins at the altar set up in front of the ramada (encampamiento altar) and the placing of these church images on the altar, the householders, together with some of the maestro-cantora group which have preceded the others of the church group, go out to the encampamiento altar in the following manner (left to right):

fiesteros	maestros	pascolas ⁸
and	and	and
fiesteras	cantoras	maso
		and
		tampaleo ⁹

At the encampamiento altar, the sponsorship of the fiesta by the fiesteros is acknowledged formally by the alpesim who wave their banners over the pascolas and maso, and then the householders. The alpesim then turn the flags over to the women householders and the procession starts from the encampamiento altar to the ramada. The matachinis and the pascolas and maso all dance, the step of the pascolas and maso being a "curtsy step," first one foot and then the other being placed in back and the knee being bent at the same time. The pascolas and maso dance into the ramada and out three times, the pascolas howling like animals, preceding the images. On each side of the maso and pascola are the matachinis who likewise dance in and out three times, finally remaining outside the ramada. After the third

⁷ The use of "sacred" and "profane" conforms to the use by Spicer, E. H., 1940 b, p. 184.

⁸ Accompanying the pascolas and maso are their two moros. The moro yaut (head moro) is in charge of the pascolas. The moro in charge of the maso is known as maso moro.

⁹ Tampaleo is the musician who plays the drum and flute (both at the same time) for the pascola dance.

time, the procession with the images has filed into the ramada and the images are placed on the altar. The pascolas and maso retire to the profane side of the ramada, and stand facing the altar. During this ceremony, the deer musicians are in the ramada, as their instruments cannot, by nature, be employed in a procession. They are singing during this time a procession song, "I don't want the flowers to move, but they constantly are moving."

After the completion of the ceremony of placing the images on the altar, the pascolas and maso retire to their respective places in the profane part of the ramada.

In the morning, at the completion of the fiesta, the images are danced out to the encampamiento altar again, the pascolas and maso leading the group, the pascolas howling like animals and all dancing to the music of the flute and drum as before. The images are formally transferred to the church group, and then the householders return with the household santo to the ramada, where it is placed on the altar. They are preceded by the maso and pascolas dancing and howling, and they again dance in and out three times before allowing the image to be brought in. None of the church group accompanies the fiesteros, maso, and pascolas, but remains at the encampamiento altar. Immediately after this, the maso and pascolas retire to return in ordinary daily dress for the thanking ceremony which occurs next, prior to the departure of the procession for the church.

The variation from this basic pattern of the fiesta is found in the pueblo fiestas. The variation is principally in the fact that a ramada, permanently located in one part of the church plaza takes the place of the household ramada. It is, in effect, the ramada for the village. It is divided into sacred and profane portions, and the fiesta which takes place in this ramada is of the same nature, but more elaborate than that which takes place in the household ramadas (figs. 17 and 18).

Also to be considered is the elaboration of the procession on the Saturday before Easter, at the ceremony of the Gloria.¹⁰ Again, as in the usual fiesta and procession pattern, the deer dancer is closely associated with the pascolas. The deer's activities are limited to dancing during the Gloria. The pascolas and moro yaut actively assist those women who throw confetti and leaves at the attacking fariseos. The maso himself, however, does not throw flowers, but dances vigorously as his contribution to the defense against the attack of the fariseos. At this time he dances to the music of the maso-bwikame, who are seated at one side of the cleared space.

¹⁰ See Spicer, R. B., MS., 1939, pp. 85-151, for description and interpretation of the events of Holy Week.

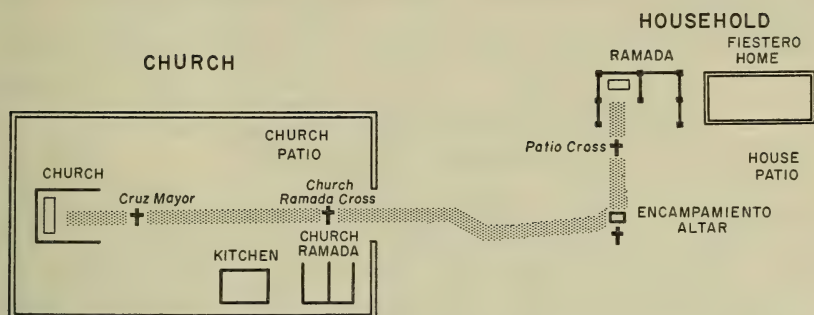


FIGURE 17.—The church and the household.

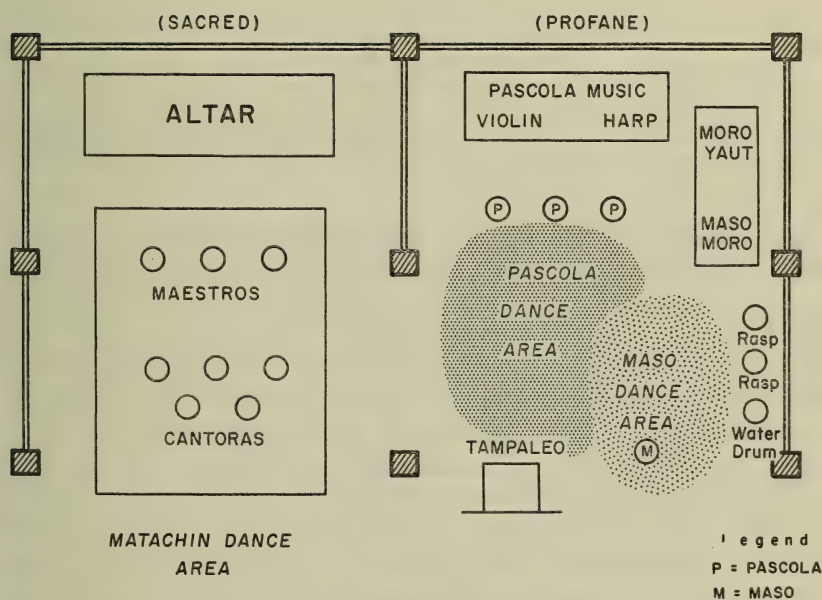


FIGURE 18.—Plan of ramada.

An example of a procession in which the maso takes part is shown on the following chart. This particular procession is to take the palms on Palm Sunday from a place near the pascola ramada to the church (pl. 39).

	x		x
Matachinis	x		x
	x		x
	x		x
	Y P P M Mm T		
	Acolytes		
	x		x
	x	alpesim	x
Caballeros	x		x
and			
Fariseos	x	Table of Palms	x
	x	(4 men carrying)	x
	x		x
	x	Figure of Christ	x
		the Nazarene	
	x		x
	x	Figures of the	x
	x	three Marys	x

CHART 1.—Example of procession in which maso takes part. (Y=moro yaut or pascola moro; P=pascola; M=maso; Mm=maso moro; T=tampaleo.)

In summary, the deer dance occurs both at household and pueblo fiestas. Of all the types of ceremonial activities considered, the deer dance is the one which appears at fiestas the least frequently. The deer dance is the only ceremonial activity which has no other form than that of a dance. The deer dance is set off from other activities also on the basis of lack of Spanish elements, something which even the pascola, basically a native performer, does not share with the maso.

The deer dance, in form, has more characteristics in common with the pascola activities than with any others. Ritually, when the deer is present at a fiesta, deer and pascola are in close association. Both pertain to the household of the fiestero, and their activities take place in that part of the ramada in which church activities do not take place. (In pueblo fiestas, the maso and pascola are identified ritually with the pueblo at large, who are the fiesteros—again in contrast to the other participating groups, those of the church.) The identification of these performers with the household or pueblo, in contrast to the church, is clearly indicated in the procession itself. The procession

is led by the matachinis;¹¹ then follow the pascolas and maso, forming a distinct group, having its own music. The pascolas and maso dance, facing first the matachinis and then the church groups which follow carrying the images. They are the representatives of those giving the fiesta, and they escort the church groups to the fiesta and away from it.

THE DEER DANCE

COSTUME OF THE MASO¹²

When dancing, the maso wears a stuffed deer head (awam, 'antlers'). This head may or may not be a real deer's head. The one in use in Pascua at the present time apparently is not genuine. The nature of the skin used could not be determined. It has glass eyes, and the head was shaped around a small pair of antlers. Ears have been added, and are tied to the lower part of the antlers so that they remain in a lifelike position. There is no bone framework for this head. When in use for ceremonies, the antlers are wound with red silk ribbon, and a large bow of the same material is placed on the head, between the antlers.

As a foundation for the deer head, the head of the dancer is wrapped in a large white cloth, of large neckerchief size. This is folded in triangular manner, the fold itself coming about halfway down on the forehead of the dancer. The sides of the cloth are carried around the head twice and tied in a knot in back. It covers the entire top of the head. Sometimes a short flat stick is inserted vertically through the knot. A small loop attached to the back of the deer head is placed around the knot. The circular bottom of the deer head (representing the upper part of the neck of the animal) then rests well forward on the dancer's head. To secure the deer head firmly, a rawhide strip which is attached to one side of the deer head is passed under the chin of the dancer and through a small opening in the ring forming the bottom of the deer head. This strip is pulled tight and secured

¹¹ It is with the matachinis that the pascola-maso group is most closely identified in the processions. The pascola-maso group dance between the church groups and matachinis, facing first one and then the other (see plate 39). It is the matachinis, pascolas, and maso who dance in and out of the church or ramada three times before the church groups enter. The possible nature of the relationship between the maso, in particular, and the matachinis will be considered later.

Another basis of division is apparent in the fiesta activities other than the processions. During the fiesta proper, in a pueblo fiesta, the matachinis, angelitas (very young girls participating through promise), and some of the maestro-cantora group return to the church after the procession. Remaining at the ramada with the image (on Easter, 1940, it was an image of the Christ Child) were the remainder of the maestro-cantora group, the angelitos (very young boys participating through promise), the caballeros, fariseos, and the pascola-maso group. This division of participants crosscuts the formal association of participants as observed in the procession.

¹² Compare with Montell, 1938, pp. 153-159, for costume and instruments collected in Tlaxcala and Yucatán.

by looping the strip under itself once. The tightened strip passes from under the chin in a vertical line in front of the ear to the deer head. The head is thus securely fastened in two places, under the chin and at the back of the head by means of the knotted cloth.

The maso, like the pascola, wears nothing above the waist. It must be noted, however, that one pascola who appeared at a household fiesta on the Friday before Palm Sunday wore a red neckerchief diagonally across his chest, passing over his left shoulder and looped under his right armpit. The maso on Palm Sunday and Easter at Pascua was similarly dressed in this respect. However, none of the pascolas wore a red neckerchief at these fiestas, and the maso at other dances observed did not wear one, but was uncovered above the waist. It is usual for both pascola and maso to have a string of black and white beads with a mother-of-pearl cross hung around the neck.

The maso wears trousers which are rolled up at the bottom about halfway up the calf of the leg. (In many cases this exposes the legs of winter-length underwear, which are not rolled up out of the way.)

Over the trousers is worn a folded, fringed rebozo, tied securely around the waist and hanging to just below the knees. This overlaps several inches in front, allowing free leg movement for the dancer. In all cases observed, this skirt has been a dark blue-green color.

Around the waist, over the skirt, is worn a heavy leather belt, called the rijutiam, from which are hung on strips of rawhide numerous deer-hoof rattles. The rawhide strips are inserted in the belt as close together as possible so that the deer hoofs are always touching and give the appearance of being bunched and standing out.

Around the ankles and extending up to the base of the rolled-up trouser legs, are strips of cocoons sewn on rawhide and wrapped around the legs. These are called teneboim. The cocoons have been opened, cleaned out and cured so that they resemble a soft white leather. In each cocoon are placed several pieces of gravel, and the entire cocoon is closed by sewing it onto the rawhide strip. According to Densmore, the cocoons are *Rothschildia jorulla* (Densmore, 1932, p. 156).

In each hand, when dancing, the maso holds a gourd rattle (aiyam). Although not necessarily, according to informants, these gourd rattles are usually of different shape. That which is to be used in the right hand is somewhat elongated, and that which is to be used in the left hand is spherical in shape. The relationship between form and function is direct in this case. The elongated one has, relatively, a shorter transverse diameter, and is better suited to the purpose of beating out the rhythm of the music. This is done by revolving the rattle, emphasizing by rapidity the first half of the circle described by the

rattle when it is used. In this way, the advantage of the short axis is utilized, as the gravel within does not have to travel so far in order to produce the desired effect, nor does the rattle have to be moved as forcibly as would be the case if it were more spherical in shape. In order to distinguish readily between the two rattles, the handles are colored differently. One has a solid blue handle, the other red.¹³ Both gourds used in Pascua are painted a bright red. The rattles are made in the following manner: the top is cut off a gourd and a small hole cut in the bottom. A wooden handle is sharpened and pressed firmly through the entire gourd and through the hole in the bottom. Gravel is put in the gourd. A cap of gourd shell already on the handle is held to the gourd and handle with gum.

The maso dances barefoot. Although he removes his headdress during the fiesta whenever he is not dancing, at no time does he put on shoes or sandals (see pl. 40 for costume of maso.)

MUSICAL INSTRUMENTS

The maso dances to the music of a set of instruments which are used for no other dance in Pascua. These are a water drum and two sets of rasping sticks.

The water drum consists of a large half-gourd which is floated, inverted, in a pan of water. The drummer steadies the gourd with his left hand, touching it lightly with his fingers, or holding to a string attached to the gourd. With his right hand he beats the gourd with a supple stick which is wrapped in cornhusks and tied by a spiraling cord. The native term for the drum is bakubaji, and for the stick, bajiponia ("water drum" and "water hitter").

The rasping instrument consists of three parts. The rasping stick itself is a narrow stick having a series of notches extending across it for almost its entire length. These are close together, resembling the arrangement of teeth on a saw. The two specimens of rasps which are in the collection of the University of Arizona are apparently made from mesquite, a very hard, dense wood. The rasp is called jirukia and means "teeth in a row." A much smaller, slender stick is used to rub across the notched stick. This is made from the same type of wood. It is, in effect, a heavy twig which has been peeled, smoothed, and rubbed until it has a satin finish. The Yaqui term for this is jirukia asola, "little jirukia." The right-hand extremity of the jirukia is rested on a bweja, or half-gourd, somewhat similar to but not as large as the half-gourd used for the water drum. This gourd is likewise inverted, but rests directly on the ground. The

¹³ See pl. 40. The handle of the right-hand gourd is carved to differentiate it from the left-hand gourd. Notice also the flower painted on one of the gourds.

player holds the left-hand extremity of the rasp loosely in the palm of his hand, controlling it sufficiently by his thumb and fingers to keep it from sliding off the half-gourd. The small stick is moved with a wrist motion rapidly over the rasp during singing by the players (see pls. 41 and 42).

Music is furnished for the deer dance by the players of the rasp and water drum. They kneel in front of their instruments or vary their position by sitting with legs crossed in front of them and sing the various deer songs as they play the instruments. The chief singer, who hums the pitch before each song and who leads the singing of each song, sits in the center, playing a rasp. The two others sit on either side of him, there being no particular order apparently, although in most of the dances observed the water drum player sat at the left of the chief singer, and the other rasp player sat at his right. A good deer singer is one who sings with much gusto, and can make his song carry over the combined noise of the rasps, water drum, maso gourd rattles, rustling of the teneboim of the maso, pounding of his feet, as well as over the various accompanying musical sounds of the pascola dance which is performed at the same time as the deer dance.

TABLE 2.—*Description of deer dance*

Musicians	Deer dancer		
	Position	Dance action	Gourd manipulation
Singers begin slow scraping of rasps. Water drum tapped slowly.	In front of deer singers, in forward part of ramada.	Put on deer head and takes gourd rattles in hand.	Shakes gourds briskly as he picks them up. Signal that maso is ready for dance.
Rasp action becomes faster; water drum tempo increases. Pitch of song hummed by chief singer.	In front of singers, facing them.		Gourds not moved, held in each hand, pointed down.
First singing of basic stanza of deer song.		Both knees bent, left foot slightly forward. Arms extended forward holding gourds horizontally toward singers. No foot motion.	Gourds vibrated rapidly with wrist and lower arm motion in series of downward jerks, resulting in continuous rattling.
Pause between first repetition of basic stanza. No singing, but rasps and drum continue at fast tempo.			Each singer saluted by three downward jerks of the gourds in unison as above. No break in continuity of rattling of gourds.
Basic stanza sung for second time.		No foot motion. Position similar to above, but becomes more erect in posture. Lifts head to look both to right and left once. Gourds held higher and closer to body.	Rattle in left hand rotated in small circle, counter-clockwise. Motion of forearm, but principally wrist. Right hand rattle beats out rhythm and keeps time with words of songs. Is rotated in larger circle or moved in series of rapid up and back motions across right side of body of dancer. Results in a churning sound.

TABLE 2.—*Description of deer dance*—Continued

Musicians	Deer dancer		
	Position	Dance action	Gourd manipulation
Basic stanza sung for third time.	Moves in limited area of ramada, in front of singers.	Foot motion begins. Step consists of rapid toe-heel shuffle on one foot, with pointing or resting of ball of other foot on ground, lightly momentarily touching the ground. Foot action shifted every four to six beats.	
Basic stanza repeated varying number of times with pauses in singing between each stanza. Rasps and drum continue.			
Concluding stanza sung. (Coinciding with singing of the word betekun, or in position where it would normally occur.)	Faces singers (in front of singers).	Turns around to right, returning to face singers.	Arms dropped to side, and extended outward. Gourds vertical, pointed to ground and vibrated rapidly, primarily with wrist motion.
Song ends with return to words and music of basic stanza.		Dances in front of singers, facing them.	Returns to churning motion of gourds.
Entire song (basic and concluding stanzas) sung twice more.	Moves in limited area in ramada, faces singers each time concluding stanza is sung.	Dances; does not vary shuffle and pointing step. Turns completely around at each concluding stanza.	Churning of gourds throughout. No special treatment as at beginning of song. Rattle below knees when turning for concluding stanza.
End of entire song (after it has been repeated three times.)	Faces singers.	Stops dancing. Puts left foot forward about eight inches, and immediately draws it back.	Holds gourd rattles pointed to ground; does not move them. Arms at side.
		Removes deer head.	Places gourd rattles with deer head in front of singers.
	Stands near singers with arms crossed.		

To supplement the preceding description of the deer dance, an account of the dance as witnessed at a household fiesta is presented.

DEER DANCE AT THE ACUÑA CUMPLEAÑO,
FEBRUARY 24-25, 1940

The celebration followed the typical fiesta pattern, with private, family observances ending shortly after noon on Saturday, February 24. Early in the afternoon, two pascolas began dancing in the dance ramada. By 7:15 p.m. the deer singers had taken their places and the third pascola had arrived.¹⁴ The maso appeared at 7:25 p.m.

¹⁴ It is interesting to note that a frequent excuse for not having a deer dance at a fiesta is that a deer dance cannot properly be given unless three pascolas are present. At Palm Sunday fiesta in 1940, only two pascolas were present, as was true of the Guadalupe Day fiesta, Guadalupe village, 1939. At the Acuña fiesta, however, a special trip was made to a point 20 miles away to secure an unwilling pascola to make a third. Another frequent excuse for not having a deer dance at a household fiesta is the cost involved. A parallel situation is reported by Toor in the Río Yaqui country (Toor, 1937 b, p. 58).

The maso came out from the house directly into the ramada, the singers singing, "Now you are coming out to play in this flower water."¹⁵ The maso moro, who accompanied him, led him directly across the profane portion of the ramada to the altar where both kneeled and crossed themselves, repeating a prayer. As this was going on the head pascola gave an imitation of a deer dance, dancing with his mask on the side of his face. The maso returned to the secular portion of the ramada, forcing the pascola away, and began dancing alone to another song which was sung immediately.¹⁶ A third song followed, in rapid succession, and the maso continued dancing. This third song was "Now let's wake up, little brother, and not be tired anymore."¹⁷

Upon the completion of this song the dancing stopped and there was no more activity in the way of dancing in the ramada until after the procession from the church arrived.

The maso removed his deer headdress and placed it with his gourd rattles on the ground in front of the deer singers. He stood almost motionless, with arms crossed in front of him in front of the deer singers. This is the usual position for the maso when not dancing. It is customary for the maso not to speak, acting the part of an animal, even when not in full costume.¹⁸

¹⁵ "Flower water" refers not only to the mythological spring around which the deer dances, but also specifically to the water of the water drum in the ramada, which is being played while the deer dances in front of it.

¹⁶ In all other instances observed, the maso and maso moro go from the altar to the patio cross where they send off cohetes (sky rockets). This is apparently an announcement, as it is so used for announcing processions and the beginning of pascola dances. Cohetes are also released by these same performers at the sunrise ceremony at fiestas which take place all night; also during the procession in a child's funeral.

¹⁷ It is customary to sing each deer song through three times if there are three pascolas present, two times if two pascolas present. Also, each complete dance consists of the maso dancing once with each pascola present. For example: while the song is sung three times, the maso dances with Pascola A. After a brief pause, while the rasps and drum continue, the maso dances with Pascola B, while the song is sung three times. The process is then repeated with Pascola C. In the occasion being described no pascola danced with the maso. Each of the three songs sung in rapid succession was sung but once.

This mode of entrance differs from that observed on Palm Sunday, 1940, in Pascua. At this time the maso came from the rear of the ramada (in the church plaza) and, led by the maso moro, stopped in front of the deer singers who were playing their instruments and singing. The maso shook his rattles before the singers several times, then turned and went to the altar in the sacred portion of the ramada. Maso and moro then went to the cross in front of the ramada, crossed themselves and set off Chinese firecrackers (said to be the equivalent of cohetes). On return to the profane part of the ramada, one pascola was dancing to the music of the drum and flute (pascola music), another was imitating a deer dance in front of the deer singers. The maso moro led the maso across in front of the dancing pascola, forced the one imitating the maso away and the maso finished the dance. He then danced with the second pascola for one complete dance (the song sung through twice).

¹⁸ Spicer, E. H. and R. B., 1936-37, field notes. If the maso talked he would be nicknamed "laughing deer" (informant, Lucas Chavez).

In 1940 in all observed instances the maso has not talked. However, at Guadalupe, Vicam Viejo, and Pascua the maso handed cigarettes to members of the crowd—a custom

With the arrival of the procession from the church, the maso and pascolas accompanied the householders, who carried lighted candles, to the encampamiento altar, being in the rear of the group. On the return to the ramada with the images, the maso and pascolas danced ahead, frequently turning and dancing back to the group with the images. With the matachinis they danced into the sacred part of the ramada and back again three times. When the images were deposited on the altar, the maso stood at one side, in the profane part of the ramada. During this period of activity, the deer singers remained in their usual place, singing one of the procession songs, "I don't want the flowers to move, but they constantly are moving."

The activities in the profane side of the ramada settled down into definite form, a form having no relationship to the services being conducted sporadically in the sacred portion of the ramada. This form consisted of each pascola dancing once to the accompaniment of the music from the harp and violin, and after an indefinite pause and rest period, each pascola dancing to the music of the drum and flute. It was with the drum and flute dance of the pascolas that the deer dance also occurred. Several times during the next few hours, the pascolas would encroach on the territory reserved to the maso, but would retreat when the maso moved in their direction. This was the only variation during the singing of the next four deer songs. These songs were:

1. "When the fresh night comes, you fly up from a mesquite branch, cukuli po.tela."
2. "Well, brother, so this is the flower deer. Shake your hoof, move your horns, rustle your teneboim, little brother."
3. "You come with the dust storm, enchanted deer, running ahead of it."
4. (An unidentified song.)

During the singing of the next song interplay between the maso and pascolas began. The song was, "Those look like mountain doves yonder, going rapidly toward the flower water. They will come away from the water slowly, side by side." The interplay consisted of

of the pascolas. Both at Pascua and Guadalupe the maso took a drink of wine from a bottle proffered by someone in the audience—an interesting departure from his usual aloofness.

On Palm Sunday in 1937, as well as in 1940, there was more activity on the part of the maso and pascolas than in the Acuña fiesta being described above. Immediately after the introductory dance of the maso, the pascolas displayed much interest in him, approaching him slowly only to retreat at the slightest movement of the maso in their direction. The pascolas then threw dust on each other (see Appendix 3), making much point of getting dust in the crotch. Thus prepared, they moved slowly toward the maso, each one making several attempts to catch him—attempts which resulted in the disappointing catching of someone in the crowd. Finally one pascola caught the maso by backing toward him. In 1940 this ended in the pascolas holding the arm of the maso, addressing him as maso ilici (fawn), pointing out the place he was to occupy in the ramada, and promptly forgetting him. No further dramatizations took place after that.

one pascola dancing closer and closer to the maso as he danced. The maso took recognition of the pascola's proximity by stopping in the midst of his dance and lunging toward him. The pascola did not go away, however, and continued dancing at the heels of the maso. Just before termination of the dance with the first pascola, the maso collapsed doing a split, but quickly recovered and finished in good order. One of the pascolas clumsily imitated the maso and had to be helped to his feet again.

The pascolas then danced to the music of the harp and violin again. The next deer dance was to the tune of the song, "Where are you lying calling, rotted stick?" The maso had to clear a space to dance in. During the dance with the second pascola, one of the other pascolas, with mask on side of face, crept in close to the flank of the maso and howled like a dog. The maso stopped immediately, peered around and then cautiously continued his dance. The pascola imitating a dog danced in back of him. Before the dance ended the maso fell twice again, but recovered each time.

During the pause between the dance with the second pascola and the third one, the maso stepped over to one pascola and pretended to suckle him with the deer head dress. The maso stepped away almost immediately and the other two pascolas rushed to take his place, clutching at the nipple of the pascola the maso had just left. The play between the pascolas continued, the maso returning to his usual place and paying no attention.¹⁹ The pascolas soon tired of their play and the final part of that dance continued, the maso dancing with the third pascola.²⁰

The next deer dance occurred after several hours, and was danced to the song, "You, enchanted ground squirrel, sound like a big animal up there in the corner (rincon) of the canyon."

This was followed by the dawn service. The family giving the fiesta went out in a group to the patio cross and performed devotions. They were followed by the pascolas and maso and their respective moros. Each individual released two cohetes and then returned to

¹⁹ An almost identical performance was witnessed at the fiesta at Guadalupe village. Another favorite bit of side play by the maso is to step gently on the toe of a pascola and keep his foot on the pascola's for several seconds. The pascola's protestations and howls of grief serve to bring the other pascolas who anxiously push away the maso's foot only to find that they too are caught. The maso will then walk away, leaving the three pascolas motionless, in apparent grief over their predicament. It takes them quite some time, in typical clown fashion, to find that their tormentor has left them and that they can move their feet again. During this time there is usually much pleading and calling of the maso to extricate them. He does not comply with their requests.

Also see Toor (1937 b, pp. 62-63) for description of a game of the pascolas and maso in Sonora.

²⁰ At Guadalupe, December 1939, the deer threw and spat water at the pascolas and crowd. Playing with water did not occur in Pascua in 1940 at the deer dances. See Appendixes 1 and 2.

the ramada. From then until about 10:30 a.m. four songs were sung, and the maso danced four more times. Two of the songs were not recognized. One was, "Where are you blossoming, mountain melon (sakobali)?" The other was one of the procession songs, "What tree without doubt is burdened with blossoms? Flower stick has many blossoms [referring to the rasps]."

The preparations for the procession from the house to church began just before 10:30 a.m. The maso and pascolas led the procession of householders out from the ramada to the encampamiento altar which had been erected beyond the patio cross. The custodianship of the images was transferred from the householders to the church participants, and the householders and their representatives, the pascolas and maso, were waved over by the fariseo bantaleo (flagbearer), and by the alpesim. This fiesta took place during Lent. The householders then returned to the ramada with the household santo, preceded by the pascolas, howling, and the maso. Pascolas and maso danced into the ramada and out again three times and the image was then placed, without further ceremony, on the household ramada altar. Pascolas and maso immediately retired to remove their costumes. They appeared shortly afterward in ordinary dress to take part in the ceremony at the encampamiento altar in which the participants were thanked by the fiesteros. Relative position of participants is indicated in the following diagram:



The family remained in place at either side of the altar and the others moved around in counterclockwise manner three times, shaking hands with the fiesteros. At the conclusion the procession formed to return to the church. The maso (not in costume) joined this procession, going with the fariseo group of which he was a member. The deer singers and pascolas did not accompany the procession.²¹

²¹ This same type of final ceremony takes place on Easter about 2:00 p.m. The maso, deer singers, and pascolas did not participate in the thanking ceremony in 1940. (The church groups act as the fiesteros in this instance.) The maso moro was the only one of the deer-pascola group to participate.

THE GLORIA
(HOLY SATURDAY MORNING)

An activity of the maso which has special ritual significance is the role he plays in the Gloria, the climax of the ceremonial activities of Holy Week (fig. 19). As observed in 1940, the deer singers, two

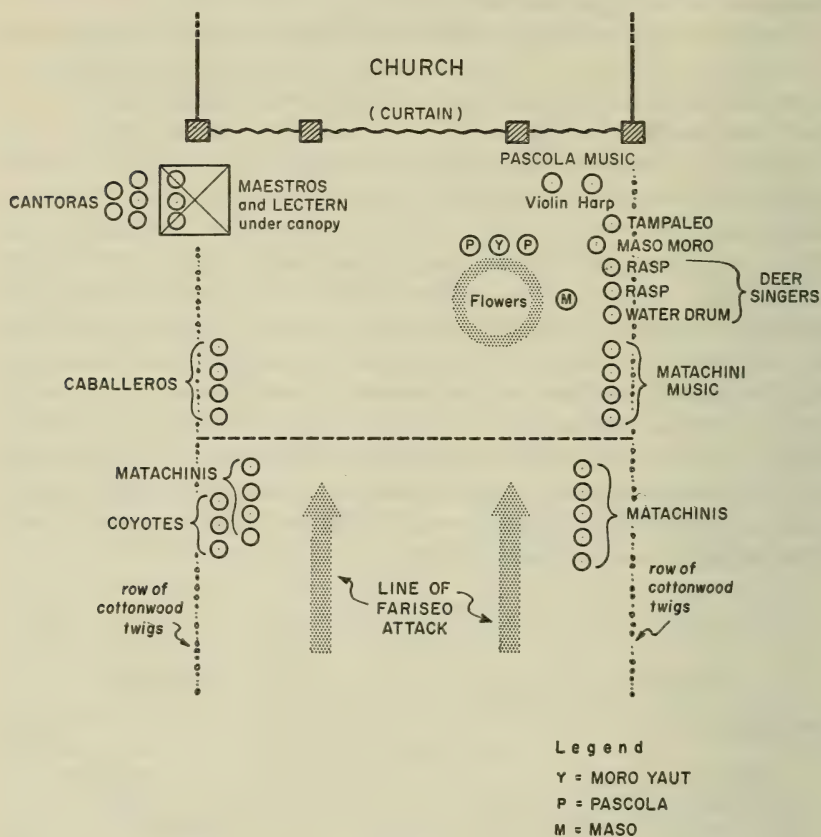


FIGURE 19.—Position of the maso at the Gloria.

pascolas²² and maso came from the fariseo shed and took their positions about 10:30 a.m. Directly in front of the pascolas, and to one side of the maso was a large canvas spread on the ground. On it was a large pile of cottonwood leaves and confetti. These represented flowers. The position of the maso and pascolas, inside a line of ashes, i.e., between the ash line and the church, indicates that they are considered "good" forces, as opposed to the "evil" forces, the fariseos. The ash line can be considered the boundary of the church. The

²² The third pascola had also served as a fariseo during Holy Week. For the Gloria he participated as a fariseo.

position of the matachinis, outside the ash line remains unexplained, although it is certain that it does not imply association with forces opposed to the church.

With each attack on the church by the fariseos, the pascolas and pascola moro throw handfuls of flowers at the invaders. It is these flowers which successfully repel the attackers. The maso does not throw flowers, but dances to the tune of "flower songs," the same as used in processions. During the first two attacks, the song to which the maso danced was "What tree is burdened with flowers." For the final attack, the song was, "I don't want the flowers to move, but they are constantly moving."

The pascolas not only throw flowers at this time, but they also dance to the music of the drum and flute, with masks on their faces. (When they throw the flowers, the masks are on the side of their heads.)

The appearance of the maso at the Gloria is of especial interest, as it definitely places him formally with the church groups for this one ceremony, even though he is the one ceremonial performer who is never promised to a diety. (Attempts are made to equate the pascola performance with service for Jesus Cristo.) It also becomes apparent that the maso is where he is at the Gloria, not only because of his usual formal proximity to his close associates—the pascolas—but because he is identified with flowers. In this ceremony so closely related to flowers, the maso apparently performs because of his association with flowers.

In summarizing the dances observed in 1940, a basic similarity is apparent in all of the performances. The dance is, in its essence, repetitious and without direct meaning to other ritual aspects of the fiesta except in a few specific instances. These are:

1. Processions. At the time of processions, the maso participates formally in association with the pascolas, as a fiestero representative.

2. At the *Gloria*, once a year, the maso, again with the pascolas, becomes identified with the church groups in a very general way, as one of the participants who is a "good" force as opposed to "evil."

The performance has elements of drama in it, but elements only. In all of the dances witnessed, a limited amount of dramatic activity between the pascolas and the maso, in the nature of low comedy, occurs. This usually happens when the pascolas encroach upon the dancing area of the maso. As a result, the deer strikes back and with his magical powers easily succeeds in befuddling the clowning pascolas. The nature of this action between the maso and pascolas is such as to indicate that it is a fragment, perhaps of an old dramatic presentation, which has particular entertainment value even though removed from its original context.

THE DEER SONGS

INTRODUCTION

Twenty songs, gathered from deer song singers at Pascua, were recorded. Emphasis throughout the process of collection and analysis was on acquiring the meaning of the songs.²³ In the following presentation, in addition to the translations offered, there is included additional commentary in the form of explanatory notes derived from the discussions and comments of the singers and informants at the time of translation.

Each song is divided into a basic and a concluding stanza. The basic stanza is repeated, with rests, ad. lib., from four to seven times. The concluding stanza is then sung once. This entire process is repeated three times in actual practice to constitute the complete rendition of the song.

Immediately following each song are two translations. The first, designated by roman numeral I, is a modern native translation as written by one of my Yaqui informants (not a deer singer).²⁴ The second translation, designated by roman numeral II, is a free translation of my own, and is offered as incorporating all or most of the ideas specifically mentioned in the song, something which is not always included in the native translation.

SONGS 1 TO 20

SONG ONE

Basic stanza (sung five times)

- | | | | | |
|----|------------------|-------------------------------------|--|-----------------|
| 1. | séwa
(flower) | malíci
(fawn) | yé.usuwéyekai
(you are about to come out) | ?ímsu
(this) |
| 2. | | séwabá.mpo
(in the flower water) | yéyewe
(you play) | |

Concluding stanza

- | | | | | |
|----|-----------------------|-------------------------------------|--|-----------------|
| 3. | ?iyimínsu
(yonder) | séye wáilo
(place name) | séwatebácipo
(in the flower patio) | |
| 4. | | séwabá.mpo
(in the flower water) | yéyewe
(you play) | |
| 5. | séwa
(flower) | malíci
(fawn) | yé.usuwéyekai
(you are about to come out) | ?ímsu
(this) |
| 6. | | séwabá.mpo
(in the flower water) | yéyewe
(you play) | |

²³ In order to make comparable the linguistic material collected among the Yaqui in Arizona and the data being collected by Mr. and Mrs. Johnson among the Yaqui in Sonora, the material has been rewritten according to the scheme of phonetic transcription used by Johnson (1962) with the following exceptions: the symbol (c) is used instead of Johnson's (č) and vowel length is indicated by (.). The departure from use of the International Phonetic Alphabet facilitates the use of this material among Spanish-speaking peoples. Stress accent has been preserved as recorded from the songs.

²⁴ Joe D. Romero. See "Informants," p. 152.

Translation

I. Little deer come out and play in this flower water. You live over there where the sun rises in the place where the flowers grow. Come and play in the flower water.

II. Little flower deer, you are about to come out in order to play in this flower water.

Yonder in séye wáilo in the flower patio you are playing in the flower water. Flower fawn, you are about to come out in order to play in the flower water.

Explanatory Notes

Line 1: málci, 'fawn', is máso, 'deer', plus 'ilci, 'little one'.

wéye is a verbal stem meaning 'to move'.

kai, a verbal suffix, means 'in order to'.

Line 3: 'iyimínsu in modern speech is 'iminsu.

séye wáilo is a place name, various designations being given. 'In the midst of the flowers', 'home of the deer', 'home of all the animals' are some of the variations. Its location is in the east. As to the position of séye wáilo in aboriginal mythology of the Yaqui, we can only guess. It is apparently a mythical place and is used in connection with animals as supernaturals.

tebáci is used in referring to the patio of a house, where the household cross stands.

SONG TWO

Basic stanza (sung five times)

- | | | | |
|----|---|----------------------|-----------------------------|
| 1. | kiáne
(I am only) | pá'aku
(distant) | sákobali
(type of melon) |
| 2. | sewáme
(which is flowering) | kiáne
(I am only) | |
| 3. | tóiyó cícibela náikímne wiwílo
(sending out vines in all directions) | jáksa
(where) | |
| 4. | wéyekai
(you are) | pá'aku
(distant) | sákobali
(type of melon) |
| 5. | sewáme
(which is flowering) | kiáne
(I am only) | |
| 6. | tóiyó cícibela náikímne wiwílo
(sending out vines in all directions) | | |

Concluding stanza

- | | | | | |
|-----|---|-----------------------------------|----------------------|-----------------------|
| 7. | 'iyimínsu
(yonder) | séye wáilo
(place name) | máiyacélu
(dawn) | bétukuni
(below) |
| 8. | tóloko namúta
(light blue cloud) | tólo baú'ula
(gray with water) | jikáwi
(top) | |
| 9. | yumáko
when it has reached) | jíka
(this) | báijewa
(mist) | yúkuta
(will rain) |
| 10. | séwabwía
(flower ground) | káiya có'ila
(sparkling) | kómsa
(bottom) | |
| 11. | yumáko
(when it has reached) | jáksa
(where) | wéjekai
(you are) | pá'aku
(distant) |
| 12. | sákobali
(type of melon) | sewáme
(which flowers) | kiáne
(I am only) | |
| 13. | tóiyó cícivéla náikimne wiwílo
(sending out vines in all directions) | | | |

Translation

I. I am just a mountain watermelon blooming. I grow vines in all directions. Where are you blooming, mountain watermelon? I grow vines in all directions. Over there where the deer lives below the dawn you go up in the sky, light blue cloud. You go slowly up, white cloud. When it reaches the top you rain like mist, and, sparkling, come down on the flower ground.

II. I am just a sákobali flowering out in the monte. I am just sending out a mass of vines in every direction. Where are you flowering out in the monte, sákobali? I am just sending out a mass of vines in all directions.

Yonder in séye wáilo, below the dawn, a light blue cloud is building up (becoming gray with water?) until it goes as high as it can. This will fall (rain), a sparkling mist when it has reached the flower ground. Where are you flowering, sákobali, out in the monte? I am just sending out a mass of vines in all directions.

Explanatory Notes

Line 1: kiáne is kia, 'no more,' plus ne 'I,' verbal suffix.

pa?aku was translated as 'out in the monte.' It is indefinite and the central meaning is 'place away from this immediate vicinity,' or 'distant.' Monte in the Rio Yaqui region is used to refer to the flat desert country which surrounds the villages. Similar to the English expression, 'the bush.'

sákobali was translated as 'horse melon,' a small, hard melon which is found in the foothills and desert of the Yaqui country. Melon is sákubai or sákobai. li is a diminutive suffix.

Line 2: sewáme consists of séwa, 'flower,' plus me, suffix meaning 'that which is.'

Line 3: tóiyó cícibela náikimne wiwílo. There are two ideas expressed in this phrase: (1) náikimne means 'I divide.' Its root is náiki, 'Four,' and implies the four directions. (2) cícibela with its reduplication indicates a meaning akin to that of náikimne. Cici as a root occurs in the word for berries, cíciam, and in the word for bat, cícial. Central meaning of this root appears to be 'spreading' or 'darting' in many directions.

wiwílo was translated as 'vines,' and no translation was given for tóiyó. It was thought best to give a free translation for the entire phrase as complete analysis of its components is not possible with the amount of material available at this time.

Line 7: máiyacélu is translated as 'the place where the sun comes up.' This is direct, specific reference to the east and the eastern sky at sunrise. Modern form is macilia.

bétukuni, literally, 'place underneath' or 'towards underneath.'

Line 8: tóloko, translated 'light blue,' is derived from tolo, 'white' or 'gray.' namúta, námu, 'cloud,' plus ta, nominal suffix.

baú?la describes the building up of a thunderhead. It is probable that the báu refers to water, ba.m. Such a meaning, describing the acquisition of water in cloud form, would balance the thought of the song, which describes the falling of the rain as the next action.

Lines

8 and 9: jikáwi yumáko is balanced by kómsa yumáko (lines 10 and 11). jjikáwi can be satisfactorily translated as 'top.' yumáko consists of yúmak, past tense of the verb 'to be able,' plus o as a verbal suffix meaning 'when.' llegar (Spanish), 'to arrive' was given as a translation for yumáko.

Line 10: káiya có'ila, best translated as 'sparkling,' contains the ideas of reflecting light as a mirror, and translucence.

Lines 10

and 11: kómsa yumáko, the opposite of jikáwi yumáko.

SONG THREE

Basic stanza

(sung twice)

- | | | | | |
|----|---------------------------|-------------------------------|-------------------------------|-----------------------------|
| 1. | besáte
(now we) | yételamte
(we sleepy ones) | súla
(tired) | búsanete
(let's wake up) |
| 2. | sáila
(little brother) | besáte
(now we) | yételamte
(we sleepy ones) | súla
(tired) |
| 3. | | búsanete
(let's wake up) | sáila
(little brother) | |

(sung twice)

- | | | | | |
|----|-------------------------------|-------------------------------|-----------------------------|-----------------------------|
| 4. | ?ábwe
(well) | sáila
(little brother) | ?ábwe
(well) | náute
(we together) |
| 5. | yételamte
(we sleepy ones) | súla
(tired) | búsanete
(let's wake up) | sáila
(little brother) |
| 6. | besáte
(now we) | yételamte
(we sleepy ones) | súla
(tired) | búsanete
(let's wake up) |
| 7. | | sáila
(little brother) | | |

(sung once)

- | | | | | |
|-----|---------------------------|-------------------------------|-------------------------------|-----------------------------|
| 8. | besáte
(now we) | yételamte
(we sleepy ones) | súla
(tired) | búsanete
(let's wake up) |
| 9. | sáila
(little brother) | besáte
(now we) | yételamte
(we sleepy ones) | súla
(tired) |
| 10. | | búsanete
(let's wake up) | sáila
(little brother) | |

Concluding stanza

- | | | | |
|-----|---------------------------|-------------------------------|---------------------------------------|
| 11. | ?iyimínsu
(yonder) | séye wáilo
(place name) | séwatebácipo
(in the flower patio) |
| 12. | besáte
(now we) | yételamte
(we sleepy ones) | súla
(tired) |
| 13. | sáila
(little brother) | besáte
(now we) | yételamte
(we sleepy ones) |
| 14. | | búsanete
(let's wake up) | sáila
(little brother) |

Translation

I. They tell the venado not to sleep and to wake up and play. Well, brother, well, let's go play and not sleep any more.

II. Now let's all of us sleepy ones wake up, little brother. Well, little brother, well, let's all of us sleepy ones wake up together, little brother.

Yonder in séye wáilo in the flower patio, now we sleepy ones, let's wake up, little brother.

Explanatory Notes

This song presented difficulties in translation to my informants, although the central idea, as expressed in the native translation, was readily apparent. Of all the songs recorded, this was sung in the fastest tempo, the water drum being particularly noticeable because of increased tempo and greater volume of sound. Much distortion appeared in the words as sung.

Line 1: yételamte was first translated as 'sleepy'. yejte'a is given as 'sleepy head'. l as a substitute for glottal stop occurs in other songs in this series also. Addition of m indicates pluralization, and the enclitic te is 'we'.

súla búsanete was translated as one word, and then separate meanings given for the two parts indicated.

Line 2: sáila is a kinship and address term for a younger brother. sái, 'brother', plus la, diminutive.

SONG FOUR

Basic stanza (sung seven times)

- | | | | |
|----|-----------------------------|----------------------------------|----------------------------------|
| 1. | túkabálita
(fresh night) | yúmako
(when it has arrived) | jikáwi
(up) |
| 2. | cá?atu
(you fly) | cukúli pó.tela
(name of bird) | cukúli pó.tela
(name of bird) |

Concluding stanza

- | | | | | |
|----|-----------------------|---|----------------------------------|----------------------------------|
| 3. | ?iyimínsu
(yonder) | séye wáilo
(place name) | máiyacélu
(dawn) | béya
(light) |
| 4. | vétukun
(under) | júnamánsu
(over there in that place) | jú.pa
(mesquite) | |
| 5. | bakúli
(branch) | jikáwi
(up) | cá?atu
(you fly) | cukúli pó.tela
(name of bird) |
| 6. | jikáwi
(up) | cá?atu
(you fly) | cukúli pó.tela
(name of bird) | |

Translation

I. When night comes, you fly up, black-colored bird. Yonder where you live under the light of dawn, over there in that place you fly up from a mesquite branch.

II. When the fresh night comes, you fly up from a mesquite branch, cukúli pó.tela.

Yonder in séye wáilo, under the light of dawn, over there in that place you fly up from a mesquite branch, cukúli pó.tela.

Explanatory Notes

Line 2: cukúli pó.tela. cúkui, 'black', plus li, diminutive. The terminal *i* of cúkui is absorbed in the process. Final meaning, 'a little black' or 'gray'. No specific meaning given for pó.tela. Meaning of entire phrase cukúli pó.tela is a bird which flies only at night, perhaps a nighthawk.

Line 4: júnamánsu, 'over there in that place', is a compound containing júna, 'that' and amán, 'there'.

SONG FIVE

Basic stanza (sung six times)

1.	ják ^s a (where)	bó.ka (lying)	kú.si (whistling)	kú.ta (stick)	moé ^l a (old)
2.	wána [?] e (over there)	bó.ka (lying)	kú.si (whistling)	kú.ta (stick)	moé ^l a (old)
3.	ják ^s a (where)	bó.ka (lying)	kú.si (whistling)	kú.ta (stick)	moé ^l a (old)
4.	wána [?] e (over there)	bó.ka (lying)	kú.si (whistling)	kú.ta (stick)	moé ^l a (old)

Concluding stanza

5.	ʔiyimínsu (yonder)	séye wáilo (place name)	júyatanáisukuni (in the midst of the monte)		
6.	junámansu (over there in that place)	bó.ka (lying)	kú.si (whistling)		
7.	kú.ta (stick)	moéla (old)	wánaʔe (over there)	bó.ka (lying)	kú.si (whistling)
8.		kú.ta (stick)		moéla (old)	

Translation

I. Yonder where you live in the midst of the forest you lie whistling, old stick. Over there in that (place) you lie whistling, old stick.

II. Where are you lying whistling, rotted stick? Over there you are lying whistling, old stick.

Yonder in séye wáilo, in the midst of the monte, over there in that place you are lying whistling, rotted old stick. Over there you are lying whistling, rotted old stick.

Explanatory Notes

Line 1: bó.ka from bo[?]o, 'to lie down'.

kú.si, 'whistling'. "whistling" as a translation does not describe the noise being made in this case. According to my informants the noise is a scratching noise such as would be made by wood-borers while working. The word kú.si describes the sound made by a flute, kusí^a, hence is a whistle. In this song however, the sound coming from the stick is not a whistle, but a rasping, scraping noise made by insects in the stick. This noise is a language which is understood by the animals and natural objects, and is the special language of the monte. Just as the whistle (kú.si) of the pascola flute (kusí^a) is a signal for the people to gather for a portion of a fiesta, so the scratching noise (kú.si) of the rotted stick (kú.ta moé^la) is a signal for gathering together. The reference is to the noise which the rasping sticks make and to which the maso dances. moé^la means old in a limited sense. Specifically, it refers to a dead stick (kú.ta moé^la) which has become riddled with insects.

Line 5: júyatanáisukuni. júya may refer to grove or forest. It is thought better to give it the translation monte as the reference is to the heavy desert thickets of thorny shrubs, small gnarled trees and

various cactus forms typical of the Sonoran desert. *ta* can be translated 'of' in this example. *náisu* refers to 'middle' or 'midst'. *kúni* means 'towards' or 'place'.

SONG SIX

Basic stanza (sung six times)

1.	sénu (one)	júyapo (in a tree)	sénu (one)	kútapo (in a stick)
2.	jabésa (who)	kuku riúriúti (breaking of sticks)	jíyawa (sound)	
3.	sénu (one)	júyapo (in a tree)	sénu (one)	kútapo (in a stick)
4.	jabésa (who)	kuku riúriúti (breaking of sticks)	jíyawa (sound)	

Concluding stanza

5.	?iyimínsu (yonder)	séye wáilo (place name)	júyatanáisukuni (in the midst of the monte)	
6.	káu.ne (you do not have)	nelebenásia (like me)	tólo (gray)	wiúla (long)
7.	takáwalekai (body)	sénu (one)	júyapo (in a tree)	
8.	sénu (one)	kútapo (in a stick)	jabésa (who)	kuku riúriúti (breaking of sticks)
9.		jíyawa (sound)		

Translation

I. In one tree, in one stick, who is making the rattling sound? Yonder where you live in the midst of the forest, you don't have a gray, long body like mine.

II. In a stick, in a tree, who is making the sound of breaking wood?

Yonder in *séye wáilo* in the midst of the monte (the whip snake says), you do not have a long gray body like mine. In a stick in a tree, who is making the breaking-wood sound?

Explanatory Notes

Line 1: There is some latitude in the translation of *júya*, 'branch', 'tree', or collectively, 'monte' being given.

Line 2: *kuku riúriúti*. Reduplication appears in verbs, denoting continued action. *kuku* is apparently related to *kúta*, *kú.si*, *kusia*—all having to do with sticks. In definition of the word *kuku riúriúti* it was indicated that this sound applied only to wood. *riúti* means 'break'. The entire word could be translated as 'breaking sticks over and over again'.

Lines 6

and 7: The entire translation of this section must be considered tentative, as *kaú.ne* does not appear to be correctly translated. Translation is lacking for several portions of the remainder of the text. In line 7, *takáwalekai* might be broken down in different manner, *takáwa* (which also occurs for 'body'), and *lekai*, the *e* being a neutral vowel in this instance. As a verbal suffix, *kai* means 'in order to'.

SONG SEVEN

Basic stanza (sung six times)

1.	jíta (what)	júya (tree)	séwa (flowers)	só'ila (is bent)	má.ci (obviously)
2.	seyá (flower)	kúta (stick)	séwa (flowers)	só'ila (is bent)	má.ci (obviously)
3.	jíta (what)	júya (tree)	séwa (flowers)	só'ila (is bent)	má.ci (obviously)
4.	seyá (flower)	kúta (stick)	séwa (flowers)	só'ila (is bent)	má.ci (obviously)

Concluding stanza

5.	?iyimínsu (yonder)	séye wáilo (place name)	se wáilo (place name)	sániluápo (in the sagebrush)	
6.	náisukuni (midst)	wóto bóli (flower name)	séwa (flowers)	só'ila (is bent)	má.ci (obviously)
7.	seyá (flower)	kúta (stick)	séwa (flowers)	só'ila (is bent)	má.ci (obviously)

Translation

I. What tree looks pretty with many blossoms? Flower stick has many pretty blossoms. Yonder where you live in the midst of the sagebrush, where the wóto bóli flowers bloom pretty.

II. What tree is definitely bent over, burdened with flowers? The flower stick (rasp) is clearly bent over with many flowers.

Yonder in séye wáilo in the midst of the sage brush, the wóto bóli is clearly bending down with blossoms. Flower stick is obviously burdened with flowers.

Explanatory Notes

Line 1: so'ila means 'bent over'. Compare with ?inépo só'isó'itiwéye, 'I am running very fast', describing running bent low.

séwa. Singular form but plural translation. Apparently a matter of literary style in the deer songs.

Line 2: séya kúta, 'flower stick'. séwa, 'flower', appears in this form (séya) in several instances in the deer songs when referring specifically to the deer, the home of the deer, or paraphernalia associated with the deer dance. This form of séwa appears to be a preserved old form.

Concluding

stanza: My informant (who also sang the songs for the recordings) departed from the recorded words in this portion of the song, as he did in the previous song, Song Six. Upon hearing the recording, he insisted that he had sung the song incorrectly and repeated the words which appear in the song above.

SONG EIGHT²⁵*Basic stanza* (sung five times)

1.	tówala (dust)	jé.ka (wind)	máke (with)	yó'ó (enchanted)	máisole (deer)
2.	tówala (dust)	jé.ka (wind)	máke (with)	yó'ó (enchanted)	máisole (deer)

²⁵ A satisfactory transcription of this song could not be made from the recording, nor was it possible to get a satisfactory translation from my informants—a translation which followed the form on the record. The song as presented is a fragment of the whole song. A concluding stanza is part of the song, but has not been transcribed.

- | | | | | | | |
|----|---------------------|---------------------|-------------------|-----------|--------------------|-------------------|
| 3. | ke
(?) | yó'ó
(enchanted) | máisole
(deer) | ke
(?) | yó.
(enchanted) | máisole
(deer) |
| 4. | yó.jiyáusime
(?) | | | | | |

Translation

- I. You run with the dust storm, scared deer, making sacred noise ahead.
 II. You run ahead of the dust storm, enchanted deer, making much noise.

Explanatory Notes

This proved to be one of the more difficult songs to transcribe from the recordings. Especially was this true because of the mixture of voices and speed of the singing.

Line 1: yó'ó is 'sacred' and 'old', i.e. 'enchanted'.

Line 4: yó. jiyáusime has not been given definite translation. Tentatively, the yo. can be identified with yoi, 'big', 'beautiful'. The i has become assimilated in the contracted form of jiyawa, 'sound', jiyau. síme would then be the verb, meaning 'to go ahead'.

SONG NINE

Basic stanza (sung four times)

- | | | | |
|----|----------------------------------|---------------------------|-------------------------------|
| 1. | ʔábwe
(well) | sáila
(little brother) | ʔini.kún
(so here you are) |
| 2. | séya
(flower) | yoleme
(deer) | sáila
(little brother) |
| 3. | lílotamyó.wa
(move and shake) | sáila
(little brother) | ʔáwasum
(antlers) |
| 4. | lílotamyó.wa
(move and shake) | sáila
(little brother) | |

Concluding stanza

- | | | | | | |
|----|----------------------------------|---------------------------|----------------------------------|---------------------------------------|-------------------------|
| 5. | kátikun
(why not) | seyá
(flower) | yoléme
(deer) | sutu
(hoof) | púliem
(cleaned-out) |
| 6. | lílotamyó.wa
(move and shake) | sáila
(little brother) | kátikun
(why not) | | |
| 7. | seyá
(flower) | yoléme
(deer) | tenebólim
(têneboim) | sí.osí.otamyó.wa
(move and rustle) | |
| 8. | sáila
(little brother) | ʔawasum
(antlers) | lílotamyó.wa
(move and shake) | | |
| 9. | sáila
(little brother) | | | | |

Translation

I. Well, brother, so this is the flower deer, brother. Move and shake your horns, brother. Why don't you move, flower deer, and shake your hoofs?

II. Well, little brother, so here you are, flower deer! Shake your antlers, little brother. Shake your antlers, little brother.

Why don't you shake your rijútiam (belt of deer-hoof rattles), flower deer? Why don't you rustle your têneboim (cocoon ankle rattles), little brother, flower deer? Shake your antlers, little brother.

Explanatory Notes

- Line 2: séya, 'flower', is a form of séwa, occurring as in Song Seven in direct reference to the deer or his associated objects. séya appears to be an archaic form of séwa.
séya yoléme, 'flower deer' or 'flower Yaqui'.²⁸ yoléme or yoréme is a term applied to Yaquis by themselves. We have in this song direct reference to the deer in the person of the deer dancer (máso). In everyday speech, the deer dancer is called máso, 'the deer', indicating the direct association of the dancer himself with the deer. The native term for "dancer" is not applied to the deer dancer.
?áwasum. ?awa means 'antler'. The usual form of plural would be awa plus m or im. sum can perhaps be explained as a variation of the regular plural ending.
- Line 3: líolíotamyó.wa indicates the use of reduplication verbally to indicate continued action. líolíó can also be applied to the movement of trees in the wind, 'swaying'. ta is a verbal suffix making an intransitive verb transitive. m can be considered a pluralizing element. yo.wa, 'move'.
- Line 5: sutu púliem is a descriptive, metaphorical term, applied to the deer-hoof rattles which are worn in a belt around the deer dancer. sutu means 'nail' or 'hoof'. púliem means 'picked' or 'cleaned out'. This refers to the hoof rattles themselves as they have been scraped, cleaned, and prepared for use in the belt (rijútiam) which the dancer wears.
- Line 7: ténebolim, a variation of the common form téneboim, cocoons filled with gravel and strung together on rawhide. These are then wrapped around the ankles of deer and pascola dancers. sí.osí.o varies from lí.olí.o as it is descriptive of motion of different objects.

SONG TEN

Basic stanza (sung four times)

- | | | | |
|----|----------------------------|----------------------------|---|
| 1. | ?imésu
(these) | káupo
(in the mountain) | ?ómo?okólim
(kind of dove) |
| 2. | bénakai
(appears to be) | ?imínsu
(yonder) | séwabáubícaka
(going towards the flower water) |
| 3. | báijika
(three) | tólo
(gray) | múlliliti
(bobbing ?) |
| 4. | báijika
(three) | tólo
(gray) | ká.tema
(go) |
| | | | jépela.
(side by side) |
| | | | ká.tema
(go) |

Concluding stanza

- | | | | |
|-----|---|---|----------------------------|
| 5. | ?iyimínsu
(yonder) | séye wáilo
(place name) | máiyacelu
(dawn) |
| 6. | séwabáubícaka
(going towards the flower water) | báijika
(three) | |
| 7. | tólo
(gray) | múlliliti
(bobbing ?) | ká.tema
(go) |
| 8. | káupo
(in the mountain) | ?ómo?okólim
(kind of dove) | bénakai
(appears to be) |
| 9. | ?imínsu
(yonder) | séwabáubícaka
(going towards the flower water) | báijika
(three) |
| 10. | múlliliti
(bobbing ?) | ká.tema
(go) | tólo
(gray) |
| 11. | jépela.
(side by side ?) | ká.tema
(go) | |

²⁸ Johnson (1962) reports séya yoléme as the name of a flower which grows in the Río Yaqui region.

Translation

I. These look like mountain doves. These three doves are hurrying, going on foot towards the flower water to drink. Yonder where they live, towards the east, yonder towards the flower water the three doves go and drink.

II. These look like 'omó'okolim over there on the mountain. With three gray heads bobbing rapidly, they walk forward to the flower water. Then the three gray heads move away, walking slowly side by side.

Yonder in séye wáilo, under the dawn, there three gray heads bobbing towards the flower water, and then coming away slowly side by side.

Explanatory Notes

Line 1: kau, 'mountain' or 'hill', is a contraction of káwi.

Line 2: séwabáubícaka includes ba.m, 'water', in one of its compounded forms and bíca, 'front', 'in front of'. ka (?).

Line 3: ká.te.ma. ka.te means 'walking'. ma, meaning not known.

*SONG ELEVEN**Basic stanza* (sung four times)

1.	?empo (you)	yó'okaukwácita (enchanted mountain ground squirrel)	benásia (like)
2.	yó.po (in big thing)	benásia (like)	jíyawa (sound)
3.	?empo (you)	yó'okauwácita (enchanted mountain ground squirrel)	benásia (like)
4.	yó.po (in big thing)	benásia (like)	jíyawa (sound)
5.	?empo (you)	yó'okaukwácita (enchanted mountain ground squirrel)	benásia (like)
6.	yó.po (in big thing)	benásia (like)	jíyawa (sound)

Concluding stanza

7.	ʔiyimínsu (yonder)	séye wáilo (place name)	máiyacelu (dawn)	béya (light)
8.	bétukuni (under)	júna mánsu (over there in that place)		yó.ta (big ?)
9.	kóvi.kun (head of canyon)	yó.po (in big thing)	benásia (like)	jíyawa (sound)
10.	ʔempo (you)	yóʔokaukwácita (enchanted mountain ground squirrel)		benásia (like)
11.	yó.po (in big thing)	benásia (like)		jíyawa (sound)

Translation

I. You, like a big mountain ground squirrel, sound like a big thing. Yonder where you live in the east, over there in that place under the mountain canyon, you sound like a big thing.

II. You, like an enchanted kaukwáci, make a noise as if it were coming from a big animal.

Yonder in séye wáilo, under the dawn, over there in that place, in the head of the canyon, you make a sound which is like that of a big animal.

Explanatory Notes

Line 1: yó'okaukwácita. The entire meaning of this song is somewhat obscured by the lack of complete meaning of the form, yo'ó. This word means 'big', but also carries with it a connotation of 'sacred', 'revered', and 'old', 'enchanted'. Johnson has indicated that there are two forms, yo'ó and yóí, with different meanings. In recording these songs it was not realized that such a distinction was semantic, with the result that the true meaning of the form as it appears in the songs is not necessarily correctly indicated in the translations. kaukwácita consists of kau, 'mountain' and kwaci, 'ground squirrel'.

Line 2: yó.po. Literal translation is 'in big'. The meaning is 'in a big thing'.

SONG TWELVE

Basic stanza (sung five times)

- | | | | |
|----|---------------------|---------------------------------------|------------------------------------|
| 1. | séwa
(flower) | malitaka
(with the body of a fawn) | có'i
(cholla) |
| 2. | séwata
(flower?) | bétukun
(under) | wéyekai
(you stand in order to) |
| 3. | ?áwa
(antlers) | jílúki
(rub) | káila
(bend) |
| 4. | ?áwa
(antlers) | jílúki
(rub) | móbela
(turn over) |

Concluding stanza

- | | | | |
|-----|---------------------------------------|------------------------------------|------------------------------------|
| 5. | ?iyimínsu
(yonder) | séye wáilo
(place name) | maíyacelu
(dawn) |
| 6. | béya
(light) | bétukuni
(under) | có'i
(cholla) |
| 7. | bétukun
(under) | wéyekai
(you stand in order to) | séwata
(flower?) |
| 8. | jílúki
(rub) | káila
(bend) | ?áwa
(antlers) |
| 9. | séwa
(flower) | móbela
(turn over) | jílúki
(rub) |
| 10. | malitaka
(with the body of a fawn) | có'i
(cholla) | jílúki
(rub) |
| 11. | séwata
(flower?) | bétukun
(under) | wéyekai
(you stand in order to) |
| 12. | ?áwa
(antlers) | jílúki
(rub) | káila
(bend) |
| | ?áwa
(antlers) | jílúki
(rub) | móbela
(turn over) |

Translation

I. Under the dripping of cholla juice you are standing, flower fawn. You are standing and bending your horns to rub. Yonder where you live under the mountain, over there in that place under the dripping of cholla juice, you stand and rub your horns.

II. Flower having the body of a fawn, under the cholla flower you stand, bending and turning your antlers in order to rub (them).

Yonder in séye wáilo under the light of dawn, under a cholla flower you stand in order to rub your antlers. Flower fawn, under the cholla flower you stand, bending and turning your antlers in order to rub them.

Explanatory Notes

Line 1: malitaka is maso, 'deer', plus ilíci, 'little one', plus táki, 'body'—'flower with the body of a fawn'. Although association of the deer and flowers is apparent in almost all of these songs, this is an instance of the deer being specifically identified as a flower. có'i, 'cholla', a type of arborescent cactus.

SONG THIRTEEN

Basic stanza (sung six times)

1.	besáte (now we)	námuriúriútine (cloud is going to break)	námuriútine (cloud is going to break)
2.	besáte (now we)	námuriúriútine (cloud is going to break)	námuriútine (cloud is going to break)
3.	besáte (now we)	námuriúriútine (cloud is going to break)	námuriútine (cloud is going to break)

Concluding stanza

4.	?iyimínsu (yonder)	séye wáilo (place name)	máiyacelu (dawn)
5.	bétukuni (under)	jiká?a (this)	tóloko (light blue)
6.	tólobaú.la (gray with water)	jikáwi (top)	yumako (when it has reached)
7.	jiká?a (this)	báijewa (mist)	yukuta (will rain)
8.	kómsa (bottom)	yumako (until it has reached)	káiya có?ila (sparkling)
9.	námuriúriútine (cloud is going to break)	námuriútine (cloud is going to break)	besáte (now we)
10.	besáte (now we)	námuriúriútine (cloud is going to break)	námuriútine (cloud is going to break)

Translation

I. No complete translation given.

II. Now we are going to make thunder. (Now it is going to thunder.)

Yonder in séye wáilo, under the light of dawn, this light blue cloud is filling up, gray with water. When it has reached the top of the sky it will rain mist until it reaches the bottom. Now we are going to make thunder. Now we are going to make thunder.

Explanatory Notes

Line 1: besáte, 'now'. The usual form for 'now' is iani. námuriúritine and námuriútine, translated as 'we are going to make thunder', or 'it is going to thunder', has the literal meaning of 'the cloud is going to break' (implying a noise when breaking). námu, 'cloud'; riúriúti, 'break'; ne, denoting future abilitative action.

This song is sung, so it is said, in the morning about dawn, when the water used in the water drum is thrown up "to make rain." The pascola drummer beats his drum, imitating thunder, when the water is thrown.

SONG FOURTEEN

Basic stanza (sung five times)

1.	séwatane (I flowers)	ká.yo (not want)	wáleka (moving)	séwatamme (they flowers)
2.	yó.sime (want to move)	séwatane (I flowers)	ká.yo (not want)	wáleka (moving)
3.	séwatamme (they flowers)	yó.sime (want to move)	séwatane (I flowers)	
4.	ká.yo (not want)	wáleka (moving)	séwatamme (they flowers)	yó.sime (want to move)

Concluding stanza

5.	ʔiyimínsu (yonder)	séye wáillo (place name)	máiyacelu (dawn)
6.	séwa bóʔopo (in the flower path)	séwatane (I flowers)	ká.yo (not want)
7.	wáleka (moving)	séwatamme (they flowers)	yó.sime (want to move)
8.	ká.yo (not want)	wáleka (moving)	séwatamme (they flowers)
			yó.sime (want to move)

Translation

I. This flower I do not want to move, but I keep on moving it. Yonder under the light of dawn on the flower path they are always moving the flower.

II. I do not want the flowers to be moving, but they keep on moving just the same.

Over there in séye wáillo, under the dawn, I do not want the flowers to be moving, but in the flower path they keep on moving just the same.

Explanatory Notes

This song is a procession song "because it has flowers in it," according to the informants. Song Seven can also be used for processions for the same reason—it is a flower song.

Functionally, this song is closely related to present-day Yaqui culture. The words of this song are the thoughts of a dead person when he sees the flower

headdresses of the matachín dancers moving in the procession. He, as a person at rest, is opposed to motion, but the flowers worn in the procession and the flowers in the path in the place under the dawn are constantly in motion.

SONG FIFTEEN

Basic stanza (sung six times)

1.	?itom (our)	yó?owa (father)	?itom (us)	tó?osi.me (is leaving)
2.	?itom (our)	yó?owa (father)	?itom (us)	tó?osi.ka (has left)
3.	?itom (our)	yó?owa (father)	?itom (us)	tó?osi.me (is leaving)

Concluding stanza

4.	ʔiyimínsu (yonder)	séye wáilo (place name)	sáto kalbário (Sacred Calvary)	
5.	bíca (towards)	ʔitom (us)	tóʔosi.me (is leaving)	ʔitom (our)
6.	yóʔowa (father)	ʔitom (us)	tóʔosi.me (is leaving)	ʔitom (our)
7.	yóʔowa (father)	ʔitom (us)	tóʔosi.ka (has left)	

Translation

I. Our father is leaving us, our father has gone from us. Yonder towards the light of dawn, towards the Saint Calvary, our father is leaving us.

II. Our Father is leaving us. Our Father has left us. Our Father is leaving us.

Over there in séye wáilo, toward Sacred Calvary, our Father is leaving us. Our Father has left us.

Explanatory Notes

This song, as is true of the preceding one, is closely related to modern Yaqui ritual and ceremony. It is sung at the conclusion of festivities in a household or village ramada when the saint is being removed from the sacred portion of the ramada to be carried in procession to its residence, the church. Sacred Calvary is interpreted as being the home of the saints, so in this one song we have definite association of some of the Christian deities with that mythical place in which all activities sung about in the deer songs have parallel occurrences. As this song is being sung, the patron deity in the sacred portion of the ramada is being taken to its home, the village church. In the mythical place under the dawn, this saint is leaving for his home, the home of all the saints. From this rather simple song we cannot escape the implication that not only have the various activities sung about in the deer songs taken place also in séye wáilo, but that the activities are drawing to a close over there in the east just as they are drawing to a close in the dance ramada in the village.

An alternative interpretation is possible: Our Father is leaving us to go to Sacred Calvary. The patron of the fiesta, and of the deer, is going back to the place under the dawn.

SONG SIXTEEN

Basic stanza (sung five times)

- | | | | | | |
|----|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|
| 1. | ʔábwe
(well) | sáila
(little brother) | ʔíkasu
(this) | tolíta
(name of rodent) | |
| 2. | méʔe
(kill) | sáewa
(they want us to) | sáila
(little brother) | ʔíkasu
(this) | |
| 3. | tolíta
(name of rodent) | méʔe
(kill) | sáewa
(they want us to) | sáila
(little brother) | |
| 4. | kúta
(arrow) | wikóla
(bow) | méʔe
(kill) | sáewa
(they want us to) | sáila
(little brother) |

Concluding stanza

- | | | | | |
|----|---------------------------|----------------------------|---------------------------|----------------------------|
| 5. | saisámola
(?) | ye.jtémta
(sit) | waiwónola
(?) | kibá.kemta
(enter door) |
| 6. | ʔíkate
(this) | tolíta
(name of rodent) | méʔe
(kill) | sáewa
(they want us to) |
| 7. | sáila
(little brother) | kúta
(arrow) | wikóla
(bow) | méʔe
(kill) |
| 8. | | sáewa
(they want us to) | sáila
(little brother) | |

Translation

I. Well, brother, they want us to kill this beaver. Well, brother, they want us to kill this beaver. They want us to kill the beaver with the bow and arrow.

II. Well, little brother, they want us to kill this tóli. They want us to kill this tóli with a bow and arrow.

Alert (with hair standing out on end ?), they wait. Seeking cover, they plunge into their homes. They want us to kill this tóli. With bow and arrow they want us to kill it.

Explanatory Notes

Line 1: tolíta, is tóli plus ta. A tóli, or tóri, is a large rodent common to the Rio Yaqui country. Johnson reports it as still being an important food animal. The translation 'beaver' is incorrect. It was given by an informant who has lived all his life in Arizona.

Line 5: saisámola ye.jtémta This phrase presented some difficulties in translation and it has not been possible to break down the first portion of the phrase to derive specific meaning. ye.jtémta is a common verb (yé.jte) meaning 'to sit' or to be motionless. This phrase has been given the free translation 'hair standing on end', implying alertness.

waiwónola kibá.kemta likewise can be given no literal translation. It describes the seeking of cover, as one might do when afraid. kibá.k was said to mean 'to go through a door', but apparently is not a word in common use. The chief deer singer who recorded these songs felt that the word was highly specialized, and referred only to a tóli, describing its entrance into its home. The translation of tóli as 'beaver' stems from the interpretation of kibá.kemta as referring to water (ba.), kibá., 'water house'. (káʔa is the usual Yaqui word for house, and is the one in common use.)

SONG SEVENTEEN

Basic stanza (sung five times)

1.	jáksa (where)	wéyeka (you are standing)	jéka (wind)	báso (grass)
2.	moéla (dry)	tólobalilíti (gray and shaking)	jéka (wind)	báso (grass)
3.	moéla (dry)	jáksa (where)	wéyeka (you are standing)	jéka (wind)
4.	báso (grass)	moéla (dry)	tólobalilíti (gray and shaking)	jé.ka (wind)
5.		báso (grass)		moéla (dry)

Concluding stanza

6.	júya mánsu (there in the monte)	séye wáilo (place name)	máiyacelu (dawn)	
7.	bétukuni (under)	jiká?a (this)	tóloko (light blue)	namúta (cloud)
8.	tólobaú.la (gray with water)	jikáwi (top)	yúmako (when it reaches)	
9.	?iká?a (this)	báijewa (mist)	yúkuta (will rain)	séwabwíawi (flower ground)
10.	káíya có?ila (sparkling)	kómsa (bottom)	yúmako (when reaches)	kíane (I am only)
11.	jáksa (where)	wéyeka (stand)	jé.ka (wind)	báso (grass)
12.	tólobalilíti (gray and shaking)	jé.ka (wind)	báso (grass)	moéla (old)

Translation

I. Where are you standing among the wind, old grass, shaking in the dust storm, old grass? Over there towards the east under the dawn, with the gray cloud going straight up. With the clear sparkling mist rain when it reaches the flower ground. Where are you standing among the wind, old grass?

II. Where are you shaking in the wind (which comes before the rain), dry grass?

Over there in the monte in séye wáilo, under the dawn, when this light blue cloud builds up, becoming gray with water, a mist will fall. It will fall sparkling, reflecting light, until it reaches the flower ground. Where are you standing, shaking in the wind, dry grass?

Explanatory Notes

Lines 1

and 2: báso moéla, 'dry grass'. Compare with kúta moéla (Song Five), 'rotted stick'.

Line 2: *tólobalilíti*. Verb showing the use of reduplication for continued repeated action, 'shaking'. *tólobalilíti* and *tolobaúla* may be more closely identified in meaning with "water" than has been indicated in the translations.

Line 6: *júya mánsu*. Should be *junamansu*, 'over there in that place'.

Line 10: *kíane*, 'I am no more than', 'I am only' is undoubtedly a mistake on the part of the informant. It occurs in the recording of this song, however. Inasmuch as the concluding stanza of this song is the same as that of Song Two, the introduction of this word can be explained on the basis of the similarity of the two songs. *Kíane* is an introductory word in Song Two, and occurs alternately with *jáksa*.

SONG EIGHTEEN

Basic stanza (sung six times)

1.	<i>ʔábwe</i> (well)	<i>sáila</i> (little brother)	<i>ʔakúnsa</i> (where)	<i>ʔaki</i> (pitahaya)
2.	<i>síyalita</i> (green)	<i>bíca</i> (see)	<i>sáila</i> (little brother)	<i>séwakámta</i> (flowering)
3.	<i>wéyekámta</i> (standing)	<i>bíca</i> (see)	<i>sáila</i> (little brother)	

Concluding stanza

4.	<i>ʔiyimínsu</i> (yonder)	<i>séye wáilo</i> (place name)	<i>maíyatcelu</i> (dawn)
5.	<i>bétukuni</i> (under)	<i>júnamánsu</i> (over there in that place)	<i>ʔabíca</i> (see it)
6.	<i>sáila</i> (little brother)	<i>séwakámta</i> (flowering)	<i>wéyekámta</i> (standing)
7.	<i>bíca</i> (see)	<i>sáila</i> (little brother)	

Translation

I. Well, brother, where do you see a green cactus, brother? Do you see with flowers, brother? Yonder toward the light of dawn, over there I see one, with flowers, brother.

II. Well, brother, where do you see the green pitahaya with its flowers standing up on it?

Over there, in *séye wáilo*, under the light of dawn, I see one, little brother, with flowers standing up straight on it, little brother.

Explanatory Notes

Line 2: *séwakámta* is a gerund form. Free translation is 'It is having many flowers'. *séwa*, 'flower'; *ka*, gerund suffix, 'ing'; *m*, pluralizing form; *ta*, necessary because of the intransitive verb *bíca*, 'see'.

Line 3: *wéyekámta* can be analyzed in the same manner.

Line 5: *júnamánsu ʔabíca* means 'over there in that place [I] see one'. *a* is direct object meaning 'it' or 'one'.

SONG NINETEEN

Basic stanza (sung five times)

- | | | | | | |
|----|-------------------------|--------------------------|----------------------|-------------------|-------------------------|
| 1. | káu
(mountain) | mayóá
(side) | káu
(mountain) | mayóá
(side) | júsali
(light brown) |
| 2. | mayóá
(slope) | sisíʔiti
(are moving) | jé.ka
(wind) | máke
(with) | káu
(mountain) |
| 3. | mayóá
(side) | káu
(mountain) | mayóá
(side) | káu
(mountain) | mayóá
(side) |
| 4. | júsali
(light brown) | mayóá
(slope) | sisíʔiti
(moving) | jé.ka
(wind) | |
| 5. | máke
(with) | | káu
(mountain) | mayóá
(side) | |

Concluding stanza

- | | | | | | |
|-----|---------------------------------|---------------------|-------------------------|-------------------|----------------------------|
| 6. | ʔiyimínsu
(yonder) | | máiyacélu
(dawn) | | betukuni
(under) |
| 7. | ʔikásu
(this) | macíwa
(morning) | jé.kata
(wind) | | kómsa
(bottom) |
| 8. | yumako
(when it has reached) | | junáʔa
(that) | | séwajé.ka
(flower wind) |
| 9. | máke
(with) | káu
(mountain) | mayóá
(side) | káu
(mountain) | mayóá
(side) |
| 10. | káu
(mountain) | mayóá
(side) | júsali
(light brown) | | mayóá
(slope) |
| 11. | sisíʔiti
(moving) | jéka
(wind) | máke
(with) | káu
(mountain) | mayóá
(side) |

Translation

I. Mountain side, mountain side, with the drizzling light brown dust storm, mountain side, mountain side. Yonder under the light of dawn, when the east wind comes, with that flower wind blowing, mountain side, mountain side.

II. Mountain side, mountain side, light brown slope you are moving with the wind. Mountain side, mountain side, light brown slope you are moving with the wind.

Over there, under the dawn, when this east (morning) wind comes it brings with it that flower wind, oh, mountain side. Mountain side, light brown slope moving with the wind.

Explanatory Notes

A dust storm is apparently implied in the words of this song, but because of the lack of specific reference to "dust" and imperfect understanding of sisíʔiti it was thought best to retain the more literal translation.

Line 2: sisíʔiti verb describing the sifting down of dust particles during a dust storm. My informant's translation of 'drizzling', i.e. 'gently raining dust', has much to recommend it.

Line 7: macíwa, 'morning', is apparently synonymous with 'east'. Contrast with máiyacélu and the modern form macília for 'dawn'.

It is interesting to note that this song has been a favorite of my English-speaking informant, but prior to the recording of this song he gave the meaning of kau mayóá as 'my home is in the mountain', confusing this with kau majóá? or some such similar expression. This informant speaks Yaqui fluently and is an active participant, culturally, in Pascua.

SONG TWENTY

Basic stanza (sung seven times)

1.	sewáne (I flowers)	wéyekai (in order to stand)	sewáne (I flowers)
2.	bó.sime (am crawling)	se wáilo (place name)	watemáli (name of an insect)
3.	sewáne (I flowers)	wéyekai (in order to stand)	sewáne (I flowers)
4.	bó.sime (am crawling)	se wáilo (place name)	watemáli (name of an insect)

Concluding stanza

5.	ʔiyiminsu (yonder)	júyatanáisukuni (in the midst of the monte)	sénu (one)
6.	kúta (stick)	bakúlia (branch)	jikáune (I up)
7.	jikáune (I up)	bóʔosime (am crawling)	sewáne (I flowers)
8.	sewáne (I flowers)	bó.sime (am crawling)	wéyekai (in order to stand)
9.		se wáilo (place name)	
		watemáli (name of an insect)	

Translation

I. I am standing in the flowers. I am crawling in the flowers to my home. Yonder in the midst of the bushes on one branch I am crawling up, I am crawling up. I am standing in the flowers, I am crawling in the flowers.

II. In order to be in the flowers, I, se wáilo watemáli, am crawling to the flowers.

Over there, in the midst of the monte, I am climbing up, I am crawling up part of a branch. In order to be in the flowers, I am crawling up, climbing up the flowers.

Explanatory Notes

It was not possible to follow the recording of this song and make an effective transcription for my informants to check. The singer who recorded the song on the phonograph was not available for translation, and the informant who sang and translated all of the preceding songs except Song Nineteen was not familiar with this song.

Line 2: se wáilo watemáli. watemáli is a "stick bug", an insect apparently associated with flowers. The insect is from the mythical place, se wáilo.

DISCUSSION OF THE DEER SONGS ²⁷

That this collection of 20 deer songs is a representative collection and includes those songs conventionally sung during a deer dance is attested to by observation of three deer dances subsequent to the recording of the songs. The following songs are those necessary to any deer dance. The order is that in which these songs were sung at the dances witnessed in Pascua in 1940.

1. Song One, "Flower fawn, you are about to come out to play in this flower water." (Introductory song.)

2. Song Three, "Now, let's all of us wake up, little brother." (This song occurs as either second or third in the series.)

3. Song Fourteen, "I don't want the flowers to move, but they are always moving;" or Song Seven, "What tree is bent over, burdened with flowers? The flower stick has many flowers." Both of these are "flower songs" and are proper for use with processions, an activity not of itself a part of the deer dance proper. One of these songs is sung on the arrival of the procession at the dance ramada.

4. An indeterminate number of songs, as for example, any or all of the songs recorded except those already mentioned and Song Fifteen.

5. Song Fifteen, "Now our Father is leaving us, now our Father is gone," sung after the *santo* has been taken from the dance ramada and the procession is about to leave.²⁸

From the above it can be seen that there are four songs which occurred in every dance witnessed at Pascua in 1940. Most of the songs collected, some 15, belong to group 4.²⁹ These songs appear in no definite order in relation to each other. Not all of them are sung during the performance of any one dance, and at least five songs not recorded have been used at Pascua at the observed deer dances. The deer songs recorded do not represent the total number of deer songs, native estimates running from 30 to 70.

FORM

A Yaqui deer song may be said to consist of a basic stanza which is sung from four to seven times (apparently the number of repetitions is based partly on the length of the basic stanza, although other considerations can affect this pattern of repetition also). A final stanza which consists of a variation in the words of the basic stanza, affecting in part the tune of the song, is then sung once. An integral part of the concluding stanza is the restatement of the theme of the basic stanza, which results in a return to the words and tune of the basic stanza as the final part of the concluding stanza.

²⁷ Song Eight has been omitted from this discussion because of the incomplete nature of its translation.

²⁸ This was not sung at the *Acuña cumpleaños*, the fiesta previously described.

²⁹ Song Seven, as an alternative processional song is not considered in this group.

This basic division of each deer song is, in effect, the reflection in form of a fundamental division in the meaning of the song. The basic stanza is a statement concerning this world. The variation in the concluding stanza relates the meaning of the song as expressed in the basic stanza to an indefinite mythical place in the East. Thus, the structural duality is paralleled by difference in meaning. Two of the songs (Nine and Sixteen) do not conform entirely to this pattern; a concluding stanza is present in each but the content of the concluding stanzas does not relate to the place in the East.

That the notion of the use of balancing and opposing structural elements is not only characteristic of the outward form of the entire deer song, but also of the internal structure of the song is evident in a number of songs collected. Balancing-opposing thought constructions are contained in the following songs:

Question-answer:

Song Seven: "What tree has many flowers? Flower stick has many flowers."

Song Five: "Where are you lying whistling, old stick? . . . "Over there you are lying whistling, old stick."

Song Two: "I am just a flowering sakobali . . . Where are you, flowering sakobali?"

Opposed types of movement:

Song Ten: "Three gray heads moving rapidly will go to the flower water . . . Three gray heads moving slowly (walking side by side) go away from the flower water."

Song Sixteen: "Alert . . . they are motionless (sit) . . . Afraid . . . they seek cover (go into a hole)."

Song Two, Song Thirteen, Song Seventeen: ". . . this cloud builds up until it reaches the top and falls. . . . until it reaches the bottom."

Negative-positive:

Song Fourteen: "I don't want the flowers to move, but the flowers are always moving."

In some of the above songs, form has been used to emphasize content. In one example this becomes a rhyme (Song Sixteen):

Song Fourteen: séwatane ká.yo wáleka
séwatamme yó.sime

"I don't want the flowers to move, but the flowers are always moving."

Song Ten: báijika tólo múliliti kátema
báijika tólo jépela. kátema

"Three gray heads rapidly go. . . . three gray heads slowly go away."

Song Sixteen: sái sámola yé.jtemta
wái wónola kibá.kemta

"Alert, not moving. . . . Afraid, running for cover."

CONTENT

Even a brief examination of the deer songs in the order presented shows that they do not form a series of episodes in a connected story.

Although many of the songs have certain characteristics in common, it can be said that these characteristics do not include a sequential and meaningful interrelation of the songs. When we consider the dancing of the maso and recall that it is not a dance of free interpretation (except in a most limited way) and that regardless of the song being sung, his dance does not vary, it must be concluded that the deer songs have very limited meaning, even within the context of the deer dance itself. It is safe to conclude that the deer songs, as used in the deer dance at the present time, are for the most part songs to which the maso dances, and nothing more.

This does not imply, of course, that no meaning can be attached to the songs themselves. They constitute a portion of the body of Yaqui folklore, and the subject matter of these songs is meaningful in itself, regardless of the present relationship of the songs to the deer dance, or of both dance and songs to their social context.

One of the most striking features of the deer songs is the recurring reference to flowers. Twelve of the nineteen songs under consideration have some reference to flowers.

Reference to Flowers in Deer Songs

Song One-----	séwa malíci, 'flower fawn'
	séwa ba.m, 'flower water'
	séwa tebáci, 'flower patio'
Song Two-----	sákobali sewáme, 'flowering sakobali'
	séwa bwíá, 'flower ground or country'
Song Three-----	séwa tebáci, 'flower patio'
Song Seven-----	júya séwa só'ila 'tree bent with flowers'
	séya kúta, 'flower stick (rasp)'
Song Nine-----	séya yoléme, 'flower deer' (also name of a flower)
Song Ten-----	séwa baubícaka, 'going towards flower water'
Song Twelve-----	séwa malitáka, 'flower with appearance of a fawn'
	có'i sewáta, 'cholla flower'
Song Fourteen-----	séwa bó'opo 'in the flower path' and general reference to flowers in motion
Song Seventeen-----	séwa bwíawi, 'flower country'
Song Eighteen-----	áki siyalíta . . . sewaka, 'green pitahaya flowering'
Song Nineteen-----	sewajé.ka, 'flower wind'
Song Twenty-----	general reference to standing and crawling in the flowers

The most important concept apparent from the above quotations is that the deer is identified as being a flower, in Song Nine a specific flower. Also, many things which are associated with the deer tend to have a flower association. The home of the deer is the "flower country." The deer plays in a "flower patio," drinks from "flower water." The water in which the drum floats, and to the drumbeats

of which the deer dances, is "flower water," and the rasping sticks to which the deer likewise dances are "flower sticks."

The mention of clouds forming and rain falling in the concluding stanzas of Song Two, Song Thirteen, and Song Seven, as well as the entire theme of Song Thirteen indicates an association of the deer with the making of rain. This association is more clearly seen when we realize that one of the principal musical instruments to which the deer dances is the water drum containing "flower water"—a definite "water" association if not rain.

Concluding stanza in Song Two, Song Thirteen, Song Seven:

"Yonder in séye wáilo, under the light of dawn, this light blue cloud is filling up, gray with water. When it has reached the top of the sky, this will rain a sparkling mist until it reaches the bottom."

Theme of Song Thirteen:

"Now we are going to make thunder."

The use of the kinship term, saila, little or younger brother, is indicative of the type of relationship established between the deer and the Yaqui. This is used in four songs, and in all but one of these the term is addressed directly to the deer.

Principal Subject Matter of Songs

Song Twenty-----	Crawling insect
Song Eleven-----	Ground squirrel
Song Ten-----	Doves
Song Four-----	Bird (probably whippoorwill)
Song Six-----	Snake (whip snake)
Song Sixteen-----	Rodent (unidentified)
Song Seventeen-----	Dry grass ("six weeks grass")
Song Five-----	Dry stick (rotted)
Song Two-----	Melon
Song Eighteen-----	Pitahaya
Song Thirteen-----	Clouds, thunder
Song Nineteen-----	Mountainside
Song One, Song Three, Song Nine, Song Twelve	Deer
Song Seven, Song Four- teen -----	Flowers
Song Fifteen-----	A deity

From the above examples we can infer much concerning the nature of the deer songs. Four of the songs are directly concerned with the deer, six of the songs deal with the fauna of the deer's habitat, four have reference to the flora of his habitat, one has specific reference to rain and nothing else, one refers to the geography of the region, and three have specific modern religious connotations. Of these last

three, two are "flower songs" and therefore have meaning in reference to the deer as well as to present-day Yaqui religion.

Special mention must be made of two of the songs, largely because of the difference in content as compared with the usual song. Song Thirteen, "Now it is going to thunder," is said to be sung early in the morning, when the "flower water" to which the deer has been dancing is thrown up into the air and the drum is beaten to imitate thunder. This song is one of the remaining ones that still have dramatic meaning today. The other one, which does not conform to the usual pattern in that it does not in the concluding stanza relate the activity to the mythical place under the light of dawn, is Song Sixteen, "They want us to kill this *toli* with bow and arrow." It is interesting to note that in this song the word *sáila* is used, indicating perhaps that the deer has power to help in the hunt, power over other animals. This song is the only song having to do with killing and hunting. It also is strongly suggestive of an incident in a dramatic representation—a characteristic of several other songs—but no other song supplements the meaning of this one.

SUMMARY

The deer songs have been considered apart from the dance in regard to their form and content. The interpretation of the content has been based primarily upon the translations of the words of the songs and general discussions by the chief deer singer. From the material available in these songs some generalizations are possible.

Considering the order in which the songs are sung it can be stated that introductory songs definitely can be identified. Following the two introductory songs (or three in the case of the *Acuña* fiesta) are any number of songs in no set order. The closing song is one related to a closing phase of the fiesta, the procession of the church participants away from the *ramada*. Whereas the beginning of the deer dance is not related to the church activities directly, its closing is determined by them. In part, then, the deer dance relies on activities apart from it for its form.

The form of the songs is distinctive—a bipartite form in which the action taking place in the world of reality is duplicated through song in a supernatural world. A literary style consisting of balancing and opposing elements of structure and meaning is apparent in the songs. As would be expected, archaic word forms are preserved in the songs. Two examples are *séye wáilo*, a place name, and *séya*, old form of *séwa*, "flower."

The content of the songs, in the absence of supporting mythological data to provide contextual interpretative material, provides a point

of departure for the study of aboriginal Yaqui religious concepts. (That these songs may be considered essentially aboriginal is indicated by the occurrence of but two Spanish words, Santo Calvario, in but 1 of the 20 songs.) It is perhaps surprising that only four of the songs are "deer" songs, in that they are about the animal himself. The deer dance, judging from the content of the songs, is not only a ceremony for the exercise of magical control over the deer, but is a ceremony for control of nature through the medium of the deer. For example: a song is sung which states that thunder is going to be made (this has been accompanied by a little drama in the past in Pascua, involving the singing of Song Thirteen, the beating of the pascola drum, and the throwing of the water from the water drum). The song relates the thunder to the mythical place in the East where clouds bring rain which falls as a mist (the same words are used with "flower ground" or "flower country" in the songs concerning plants; in other words, we have identification of the mythical place in the East with the "flower country"). The direct causal relationship between rain and flowers is explicit in these songs. Flowers are a manifestation of rain.

To relate the deer to flowers is not difficult, a concept not unique, as among the Huichol the deer is identical with peyote. "Flower fawn," "flower with the body of a fawn," and séya yoléme (the name of a specific flower) are names applied to the deer in the songs. The deer is also associated with the "flower water" and "flower patio" of the mythical place in the East (the same place where the songs indicate the rain falls on the "flower ground"). The deer as he performs his dance in the ramada dances to the beat of the gourd which floats in "flower water" and to the rasping of séya kútam, sticks "obviously overburdened with flowers." Thus, through his flower association, the deer is conceptualized as being closely connected with rain.

The fact that all of the songs are not rain, flower, or deer songs does not affect the validity of the above reasoning. We know that the deer dance has elements of drama in its performance today and that in the past the deer and pascolas acted out various dramas.³⁰ Knowing that there are aspects to the deer dance other than that of a rain ceremony we might reasonably expect these aspects to be reflected in the form and content of the songs, even as the rain ceremony aspect is reflected in the form and content of certain of the songs collected. As examples of variation in form with variation in content Song Nine and Song Sixteen can be considered. Neither in the concluding stanza relates the action of the basic stanza to the mythical

³⁰ See Appendixes 1 and 2, Refugio Savala's accounts; also Toor, 1937 b, pp. 62-63.

place in the East. Song Sixteen speaks of killing "this toli." This is the only song dealing directly with killing or hunting. This variation in form and content would seem to indicate that the original context of this song was different from that of the deer-rain-flower songs. Song Nine shares with Song Sixteen the distinction of not following the formal pattern of meaning of the basic and concluding stanzas. From the words of this song it can be seen that the song is addressed directly to the maso as he dances in front of the singers and musicians for direct reference is made to the costume of the maso. It is in this song that we have the deer directly associated with the flower, séya yoléme. It is a song in which drama is explicit.

VARIATION IN FORM AND MEANING

From the variation in content of the songs, we may infer that the form of the deer ceremony in the past was variable.

Accounts of informants indicate that dramatic presentations were once a part of the deer ceremony in Pascua. The killing of the deer and the making of rain are dramatic performances which have been observed in Pascua within recent years.³¹

A resident of neighboring Barrio Libre who is a deer singer and occasionally participates as a matachini in Pascua, states that the deer dancers of the present do not perform the body movements nor handle the rattles in the style of former years. He described the former dancers as being more lifelike in imitating a deer's movements.³²

Many informants report that the deer dance was held more frequently in the past in Pascua.³³ Informants tend to predict a deer dance for a scheduled ceremony, only to have the prediction prove to be false. In 1936-37 we know that the deer dance was held only four times. It was not held more frequently in Pascua in 1940. Information from the Rio Yaqui region from the one source which covers more than the period of time of the Easter ceremonies is that the deer dancer appears at practically every fiesta in Vicam and Vicam station. It is specifically reported as being present at the funeral of a child (Johnson, 1962), a type of ceremony at which the deer dance does not occur in Pascua.

Past meanings associated with the deer may be inferred from the meanings reported from other tribes of the Southwest-northern

³¹ Even members of the younger generation are acquainted with these performances. Appendixes 1 and 2 are accounts of dramas enacted by pascolas and maso. Toor (1937 b, p. 63) describes a dramatic performance related to her in one of the Yaqui villages in Sonora.

³² Informant, Leonardo Alvarez, 1940.

³³ Informants, Lucas Chavez and Frank Acuña, 1940. Also Spicer, E. H. and R. B., 1936-37.

Mexico culture area. Sacredness of the deer varies from deification among the Huichol to appearance of the deer in nonsecular ceremonies among the Pueblos. (A meaning common to all groups is the association of curing with the aid of the deer.) Curing by means of the deer's tail is reported in recent times by Toor (1937 b, p. 55) among the Yaqui in Sonora. It is reported that the deer's tail is considered an important cure-all, and is kept in individual homes in the Sonora villages.

Past meanings may be assumed to be discoverable in the deer songs since these are regarded as being of some antiquity by Pascuans, and the subject matter obviously relates to the past environment of the Arizona Yaquis. The importance of flowers overshadows that of the deer in the songs. Numerically, the word for flower appears in 12 of the songs (many times in some of these), whereas the songs explicitly about the deer are limited to 4. The songs tell of the "flower fawn," "flower person," "flower Yaqui," and "flower with the appearance of a fawn." From these examples it is apparent that the deer was meaningful because of his association, and even identity, with flowers.

Again, through the medium of the deer songs, we see that flowers and deer were considered a manifestation of rain.

At the present time in Pascua the deer dance is meaningful because of the cultural importance of dancing.³⁴ Several informants have pointed out one of the residents of Pascua, who is a deer dancer, as being the champion deer dancer of the world. They take great pride in this.³⁵ However, the deer dance is perhaps the least popular of the forms of dance. Young men have been observed in the early morning hours of a fiesta practicing the pascola dance steps, but not those of the deer dancer.

The deer dance is performed only at major fiestas in Pascua at the present, and is closely associated with the most popular performer of the fiesta, the pascola. The fragments of drama in the form of comedy participated in by the pascola and maso are obviously enjoyed by the crowd.

Among the younger generation, the deer is not an animal with which most are well acquainted.³⁶ The absence of understanding extends to

³⁴ In one instance a young man who had worked day and night for 4 days in Holy Week as a caballero performed an arduous matachini dance with the first appearance of the matachinis after the Gloria. He did this of his own volition (and because he was a matachini as well as a caballero).

³⁵ Informants, Juan Silvas, Angel Acuña, and Frank Acuña.

³⁶ For example, Joe D. Romero (see "Informants," p. 152). He has never seen a deer, has never hunted, and none of his associates hunt. He has never been in the mountains around Tucson, except in the nearby foothills on wood-gathering expeditions.

the ceremony itself. At the Acuña fiesta a young boy of about 16 inquired into my purpose in attending the fiesta. When told it was to hear the deer songs, he volunteered:

That's something I have wondered about. There are lots of things happening here that I don't know about. Some of these men [indicating the performers] know all about it—the old things. But most of us don't know.

Among the older generation the deer dance is somewhat more meaningful. One informant, Lucas Chavez (Spicer, MS., 1936-37), says that the water used in the water drum is *agua bendita* (holy water) because it has been sung to during the deer dance. The singing of the deer singers is not considered comparable to the singing of Mexicans at a dance, but is like that of one who sings as if making a vow. For this reason the water is blessed, and it is beneficial to women if they are drenched by the water when the *pascola* throws it at a fiesta, as it insures fertility. It is considered peculiar behavior for women in the audience to run away to keep from getting wet.

One of the deer singers, informant Frank Acuña (Spicer, MS., 1936-37), says the deer songs are like prayers. Another, informant Angel Acuña, a deer singer also, in explaining the meaning of the processional song "I don't want the flowers to move" (Song Fourteen), said that the flowers mentioned in this song were the same as those which the *matachinis* wore in their headdress. The flowers moving in the flower path, as mentioned in the song, were also interpreted as being *matachin* flowers.

It is the consensus in Pascua in 1940 that the deer dance is meaningful as a traditional part of Yaqui culture. It is considered entertaining and interesting because of the technical skill of the dancer and the fragmentary comedy enacted with the *pascolas*.

There are, in addition, specialized meanings, not part of this consensus, ranging from almost complete ignorance as to any meanings of the deer dance to detailed interpretation of specialized concepts, particularly those in the deer songs.

Among those to whom the deer ceremony has a more definite set of associations and meanings, it is still partly sacred in character. Sacredness is derived from two sources: the traditional nature of the ceremony as an expression of "true" Yaqui culture, and the identification of the ceremony as a flower ceremony, which links it closely with the formal and conceptual aspects of modern Yaqui religion.

The appearance of the deer dancer at the major ceremony of the year at Pascua, Easter, has particular significance. Here the flower deer joins with the *matachinis* and others whose flowers are used to destroy the *Fariseos*. Its appearance at the fiestas of Palm Sunday

and San Ignacio, patron saint of the village, must be attributed primarily to the fact that these are also major pueblo fiestas.

The appearance of the deer dancer at the Acuña fiesta may most readily be explained in terms of the meanings of the deer to members of this household. It is a family of deer singers, and in addition, this family bends every effort to make their fiesta the biggest social event of the ceremonial season in Pascua. Quite probably they equate their fiesta in magnitude and importance with the pueblo fiestas by seeing that the deer dancer performs.

CONCLUSIONS

The deer dance among the Arizona Yaqui is undergoing change. Residents of Pascua report changes within the immediate past, and accounts from the Yaqui homeland reflect noticeable differences between the Sonora and Arizona Yaqui deer dance ceremonies. Analysis of the deer songs inferentially indicates changes from more ancient form and meanings, and comparison with other tribes offers contrast with traits common to the Southwest-northern Mexico culture area.

Change has been in the nature of a loss of meaning related to the deer dance ceremony. Traits presumably once a part of the complex, but no longer characteristic of the deer dance as observed in 1940 in Pascua include:

Dramatic performances (related to killing the deer and making rain)

A more freely interpretative form of the dance

Frequent performances, and performances at many different types of ceremonies

Deer a deity

Curing concept related to the deer

Deer-rain association

Deer ceremonially meaningful because of Yaqui environment

The persistence of meanings attached to the deer dance in Pascua may be attributed to:

The association of the deer with meanings now attached to flowers

Recognition of the deer dance ceremony as an activity within the Yaqui tradition, and therefore a desirable part of major pueblo fiestas

The deer as a representation of a sacred entity no longer exists, but sacredness of the songs to which the deer dances, derived from their flower association, imparts sacred meanings to the deer ceremony because of the culturally important concept of flowers in Arizona Yaqui religion. However, the flowers are considered to be culturally sacred because of the meanings attached to flower symbols used in Arizona Yaqui religious activities other than the deer dance.

APPENDIX 1³⁷

THE DEER HUNT

Part 1

The ground is prepared green brush is planted to give the scene of a forest it is played by the pasco oholas and the deer singers and dancer.

The hunter has two sons he sends the oldest to his neighbor to barrow the instrument with which they will perform the Satyrical songs for the hunting dance.

"Go into the forest to the camp where my friend is and give him this canteen of sweet water and tell him this is from the stream in the border of which we are camping, so he may also taste it, after he has tasted the water tell him that I sent thee to barrow the "Hee-Rooke-Jum"

The boy is so coward he is almost crying because he is afraid to go into the forest because he knows that coyotes are abundant finally he departs when he arrives he salute in a way of respect "Dee-os-enchee anee-ah" "atchae" and when he is received he begins to tell the old men these things: "My father thy friend hast the need of this errand and to thee sent me, this canteen of water contains the sweetwater from the stream that flows near by our camp my father doth desire that thou should taste it so that thou mayest know that we are in a choice country and this one thing he also did, my father desire that thou mayest let him know if by any chance in thine family is there a girl that I could take in marriage" The old man answers him smiling.

Part 2

"There are three girls in my family which I also desire to give in marriage but tell thy father to come hither and select the one he like most for thee"

The boy return to his father and merrily explains everything the old men had told him but his father did not send him for this purpose and he get so angry and whip the boy and when the younger was sent he does the same thing in the last. Their father goes and explain everything and barrow from the old men the "Hee-rooke-jum" when he bring them he and his two sons begin to sing a spring song when their father says these words: "the cool eastern wind bring the spring blossom perfume to the shanty where I live" the two boys leave the "Hee-rooKee-jum" and looke around and sense the wind, in the meantime the man in charge of the deer dance steal them and their father again whip and make them find them this happen until at last the singing is finished and the "Hee-rooke-jum" are taken back to its owner. In preparing for the hunt they gather up some spicy weeds and burn them and with it they fume up their body all over so the deer wont sense them. The father and his older son dressed in full hunt costume arch and arrows and a skullful dog "pochee" which help them in the search of the game.

Part 3

The hunt begin in the Ramada where the deer and the "pasco,oholas" dance the deer is chased out into the patio, the man in charge of the deer dance is with the deer and it hides behind him everytime the deer is found it sounds the

³⁷ Appendixes 1-3 consist of accounts written by Refugio Savala, a 26-year-old Yaqui. These accounts are part of the material collected in Pascua by Dr. John H. Provinse in 1935-36.

rattles and run in this the boy is frightened and also run away throwing his bow and arrow and hat away then his father whip him and make him find the things he has lost the dog runs about and bark the hunter will shoot any person who happen to be near, in the ground the hunters dig and water is found after a great deal of search and the deer is found and killed. Sometimes the hunters carry the game on their shoulders and sometimes a burra carry it into the Ramada they get the skin and they go into the wood and find tanning post this also a "pasco,ohola" who stands among crowd the pascohola cut the post when it is falling and some one is near him it happens that he or she gets a hard slap in the face the other "pasco, ohola" to tan the skin he puts it in the pan of water and wet it is thrown upon the back of the "pasco,ohola" who act as the post and it is done even when it is cold in winter now when it is made into a good pelt the pascooholas begin to peddle it after the measurement is figured out it is bought with liquour all the water that the "pasco,ohola" drink during the deer hunt is pure liquour.

REFUGIO SAVALA

APPENDIX 2

THE RAIN

In the morning the "pasco, ohola" barrow the drum from "Tampaleo" begin to rumble with it striking lightly the beams of "ramada" with it. This is to produce the noise of the Thunder and the "pasco, ohola" make the lightnings with the tongue sticking it out, after this is done the three "pasco, oholas" get all the gourd cups of the deer singers and get the water on the big pan which is also the deer singers' instrument now The "pasco, ohola" will throw the cup of water on anyone who happens to be near just like the Rain, many people run away and the "pasco, ohola chase them far out of "Rama" sometimes people who fall sleep near the dance are awakened with the last heaviest shower which is the big pan of water it is said that it is good luck to get soaked by this play Rain but the majority run away for shelter specially in winter.

After the rain again the pan of water is filled and the dance continues for a short time with same funny deers songs which the "pasco, cholas" dance. When the deer hunt is going to be dance it is began after "The Rain."

REFUGIO SAVALA

APPENDIX 3

THE DEER HUNTER

Part 1

The deer hunter has a very peculiar method of working out the plan of the hunt. Since this method is not performed with a gun, the hunter goes into the forest and set the traps. This trap are also the indian method. a rope of mezcal fibers which is the color of the earth, and long enough to reach the top of a big tree near the lakes where the path of the deer is visible, there in the middle of the path a round hole is dug deep enough to bury the rope and four stake are driven deep to hold the rope the one stake that holds the key has a fork where on the rope pass and the rope has a little wooden knob which is hooked to the fork of the stake the long rods that goes in the center is another key which locks the little knob on the rope from the four stake the three other rods lay on top of the key rod so the knot lock of the rope lay loose in a round

coil the stake of the fork holds down with the rope a very strong limb which bent down. hooked with the rope to the stake now when the deer step on either one of the four center rods this bent limb throws the laso on the deer's leg that some times it hold it without touching the ground with the leg where the rope has caught it.

When the deer hunter has all his traps set in the evening he and two others begin to sing the song of the deer hunter which in composition is very beautiful sometimes the singing last all night the hunter or rather trapper, leave at dawn and find his prey on the trap alive and he slay it with a knife which he thrusts on the deer's collar. Thus the blood is drained and the meat is good to eat and in this manner the skin is not damaged, now to carry his game on the shoulder one of the hind legs is tied on one of deer's horns because this is the way it will not squeeze the carrier's neck or shoulders. If one would try to tie the legs together and carry it on the shoulder it would squeeze the blood out of it, if one would try to carry it with loose body it would roll off the shoulder.

Part 2

The deer hunter sometimes use the arch and arrow or gun but when they want it just for food, they also sing some hunt songs before they go and they bathe early in the morning or evening previous to the hunt and when they leave they burn some weeds and covered with a blanket fume their body so the deer cannot scent them with in a close distance, the deer has a very keen perception for humans, for this reason a deer hunter must be clean. The trapper also uses the same method for the hunt when he goes to set the trap he also bathe and fume his body and above all, everything that the trap is made is carefully rubbed with some green weeds and tree leaves so that no trace of human odor is left where the trap is.

The deer trapper also make a living out of his trade he tans all the skins and probably his wife is also a good tanner and may be good maker of skin jackets which is a demand in the Yaqui country people who work this are always making more money because even women wear the deer skin outfit or at least the trapper sells the tanned skin to those who work it in fancy styles and when they go into the "Yorim" they sell the skin on a good price no matter what quantity Mexican "Talabarteros" usually preffer the Yaqui deer skins.

There are people who stay in the wilderness all the year or part of the year merely trapping and hunting deers, in season of progeny only bucks are slain in order to preserve the game.

REFUGIO SAVALA

REFERENCES

BEALS, RALPH L.

1932 a. The comparative ethnology of Northern Mexico before 1750. *Ibero-Americana*, No. 2. pp. [93]-225.

1932 b. Aboriginal survivals in Mayo culture. *Amer. Anthrop.*, n.s., vol. 34, No. 1, pp. 28-39.

BENNETT, W. C., and ZINGG, R. M.

1935. *The Tarahumara*. Univ. Chicago Publ. Anthropol. Chicago.

BOGAN, PHEBE M.

1925. Yaqui Indian dances of Tucson, Arizona. *Arizona Archaeol. and Hist. Soc.* Tucson.

BUNZEL, RUTH L.

1932. Introduction to Zuni ceremonialism. 47th Ann. Rep. Bur. Amer. Ethnol. for 1929-30, pp. 467-544.

BUTTREE, JULIA M.

1930. The rythm of the Redman. New York.

DENSMORE, FRANCES.

1929. Papago music. Bur. Amer. Ethnol. Bull. 90.
1932. Yuman and Yaqui music. Bur. Amer. Ethnol. Bull. 110.

DOMINQUEZ, FRANCISCO.

- 1937 a. Yaqui customs. Mexican Folk-Ways, Yaqui Number, July. Mexico, D. F.
1937. b. Yaqui music. Mexican Folk-Ways, Yaqui Number, July. Mexico, D. F.

GAMIO, MANUEL.

1937. The importance of Yaqui folklore. Mexican Folk-Ways, Yaqui Number, July. Mexico, D. F.

HOLDEN, W. C., ET AL.

1936. Studies of the Yaqui Indians of Sonora, Mexico. Texas Technol. Coll. Bull., vol. 12, No. 1.

JOHNSON, JEAN B.

1962. El idioma Yaqui. Publ. Inst. Antrop. e Hist., Dept. Invest. Antrop., No. 10. Mexico, D.F.

LUMHOLTZ, CARL.

1902. Unknown Mexico. Vols. 1 and 2. New York.

MONTTELL, G.

1938. Yaqui dances. Ethnos, vol. 3, No. 6, pp. 145-166. Stockholm.

PARSONS, ELSIE CLEWS.

1932. Isleta, New Mexico. 47th Ann. Rep. Bur. Amer. Ethnol. for 1929-30, pp. 193-466.
1939. Pueblo Indian religion. 2 vols. Univ. Chicago Publ. Anthropol.

PARSONS, ELSIE CLEWS, and BEALS, RALPH L.

1934. The Sacred Clowns of the Pueblo and Mayo-Yaqui Indians. Amer. Anthropol., vol. 36, No. 4, pp. 491-514.

PROVINSE, JOHN H.

- Field notes. Pascua village. MS., 1936-37. Deposited with Dept. Anthropol., Univ. Arizona, Tucson.

SPICER, E. H.

- 1940 a. The Yaqui Indians of Arizona. The Kiva, vol. 5, No. 6. Arizona Archaeol. and Hist. Soc., Tucson.
1940 b. Pascua, a Yaqui village in Arizona. Univ. Chicago Publ. Anthropol.

SPICER, E. H., and R. B.

- Field notes, Pascua Village. MS., 1936-37. Deposited with Dept. Anthropol., Univ. Arizona, Tucson.

SPICER, R. B.

- The Easter fiesta of the Yaqui Indians of Pascua, Arizona. MS., M.A. thesis, Univ. Chicago, 1939.

TOOR, FRANCES.

- 1937 a. The Yaqui festival makers. Mexican Folk-Ways, Yaqui Number, July. Mexico, D. F.
1937 b. Notes on Yaqui customs. Mexican Folk-Ways, Yaqui Number, July. Mexico, D. F.

UNDERHILL, RUTH MURRAY.

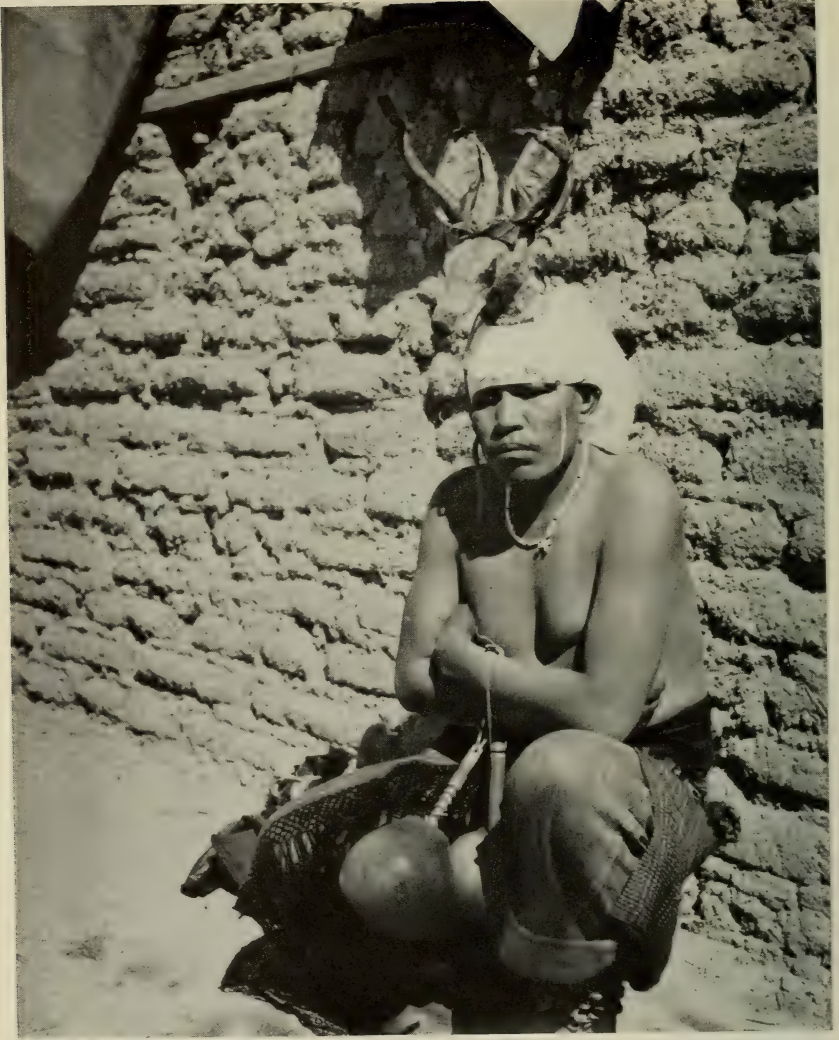
1936. The autobiography of a Papago woman. Mem. Amer. Anthropol. Assoc., No. 46.
1938. Singing for power; the song magic of the Papago Indians of Southern Arizona. Univ. California, Berkeley.
1939. Social organization of the Papago Indians. Columbia Univ. Contrib. Anthropol., vol. 30.
1940. The Papago Indians of Arizona and their relatives, the Pima. Sherman Pam. No. 3, U.S. Office of Indian Affairs, Haskell Institute, Lawrence, Kans.

ZINGG, R. M.

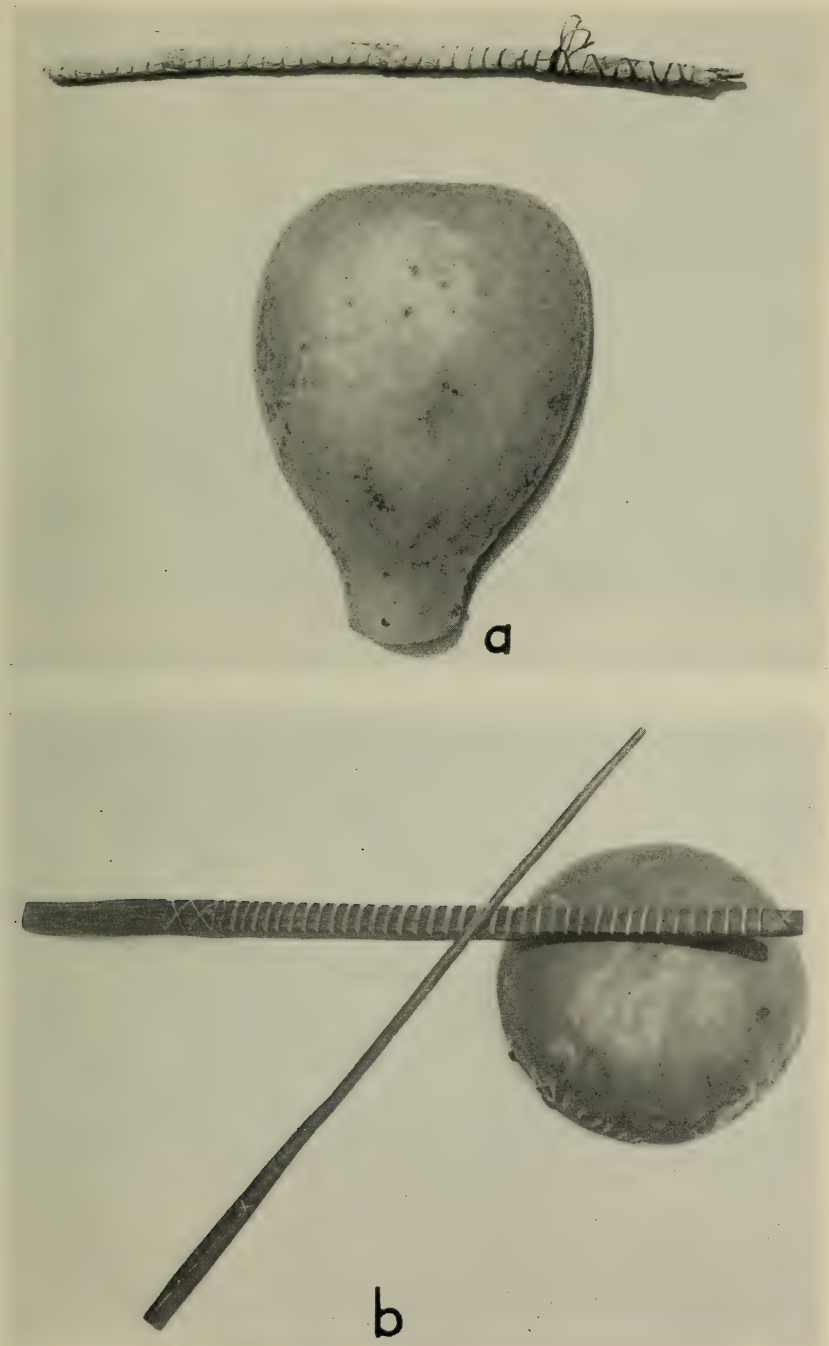
1938. The Huichols: Primitive artists. Univ. Denver Contrib. Ethnol. No. 1.



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CHIPPEWA MAT-WEAVING TECHNIQUES

By KAREN DANIELS PETERSEN

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John Macfie : Plate 60(b).

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CHIPPEWA MAT-WEAVING TECHNIQUES

By KAREN DANIELS PETERSEN

INTRODUCTION

"No class of articles of textile nature were more universally employed by the aborigines than mats," says Holmes (1896, p. 18). Skinner (1921, p. 242) comments, "It has never been realized how many ingenious and often complicated styles and technics of weaving may be found among the mats of the . . . Central tribes, so that an insufficient number of examples are at hand for study."

For comprehending the techniques of weaving, a study of examples in museums is inferior to observation of the process in the field. Yet, in the foreseeable future such observation will no longer be possible among the Chippewa. The more difficult arts are dying with the older generation. A wide acquaintance among Minnesota craftworkers over a period of 9 years failed to reveal any other practicing weavers of the mats observed for this paper except those herein mentioned. All of these women were past middle age, and in no case did the younger woman who assisted the weaver know the technique before seeing it done for the purpose of research. Therefore, convinced of the quality and ingenuity of Chippewa weaving, the writer and her husband, acting as a research team, visited northern Indian areas of Minnesota in July and October 1957, July and August 1961, and August 1962 for recording some of these vanishing techniques in the field.

Chippewa mats may be divided into two groups on the basis of size, usefulness, and universality. The three major mats and one of the minor—all the mats of which the technique is known except reed and sweetgrass—employ the loose-warp (Lyford, 1953, p. 77) or suspended-warp (Wissler, 1931, fig. 17) technique which characterizes much Chippewa weaving, including bags of cedar bark or roots (Densmore, 1929, pl. 64, *b*; p. 158), basswood bark (Lyford, 1953, pp. 78–80), and slippery elm; and the famous yarn bags (Densmore, 1929, pl. 67). The unsupported statement that one of "the most primitive materials [was] a cloth woven of nettle-stalk fiber . . . in 'tubular form' like the yarn bags" is made by Densmore (1929, p. 30). Finger-weave bands of yarn (Lyford, 1953,

pp. 69-75, pl. 36) and braids of yarn, leather, beads, basswood bark, rags, and rabbitskin (Densmore, 1929, pp. 36, 77, 111, 129; Lyford, 1953, pp. 95, 101) may also be called loose-warp weaving.

The weave is so called because, contrary to much primitive weaving, the vertical warp is not fastened at the lower end. Since it hangs free, no mechanical device can be used to raise or depress alternate warp strips at the same time so as to allow a shuttle to be quickly passed between the threads with a single motion. Hence a great deal depends on the skill of the worker's fingers.

Within a tribe as scattered as the Chippewa, diversities in details of techniques naturally arise. Moreover, the non-Indian unfamiliar with the crafts is bound to misinterpret some of what he sees and reports. It seemed wise, therefore, to draw in for a bibliographical roundtable not only the ethnologist, archeologist, and ethnobotanist, but a cross section that includes the army officer, missionary, trader, explorer, geologist, traveler, government employee, geographer, historian, Indian captive, hobbyist, craftwork specialist, and artist. Together they have woven the record of a fragment of the ancient culture that they witnessed for those generations who will never see it except through the eyes of these writers.

The writer is deeply grateful to those who have made this study possible: to the Chippewa weavers and interpreters mentioned in this paper, for patiently instructing a novice in their ancestral arts; to Dr. Elden Johnson, assistant professor of anthropology, University of Minnesota, for suggesting the first research trip, reading the manuscript, and demonstrating his confidence in the project by frequent helpful suggestions; to the Myers Family Foundation of St. Paul, Minn., for their financial assistance toward the research trips; to the Science Museum, St. Paul, for the typing of the manuscript; to the members of the staffs in the St. Paul Public, James J. Hill Reference, and Minnesota Historical libraries for their unfailing courtesy; to the Minnesota Archeological Society for sponsoring the first trip; to Conrad C. Reining, assistant professor of anthropology, University of Minnesota, for valuable advice; to Robert Spading, of Minneapolis, John Macfie, of Parry Sound, Ontario, and Edward S. Rogers, associate curator, Royal Ontario Museum, Toronto, for data on the reed mat; to John B. Baird, of St. Paul, for his assistance; to Dr. John W. Moore, associate scientist, botany department, University of Minnesota, and Dr. John B. Moyle, supervisor, Minnesota Game and Fish Research, for help on botanical problems; and most especially to her husband, Sidney A. Petersen, who preserved botanical specimens, took care of field photography, finances, and transportation, and helped the weavers with the heavier duties.

PHONETIC SYMBOLS

a as in art
e as in prey
i as in police
o as in go
u as in rule

ě as in met
ĩ as in bit
ũ as in luck
oo as in good

ñ as in cañon
s as in since
g as in give
sh as in she

Dt, td, gk indicate sounds between these consonants.

MAJOR MATS

CEDAR-BARK MAT

TECHNIQUE: PLAIN AND TWILLED PLAINTING

"Plain plaiting is made by passing the elements over one and under one" (Lyford, 1953, p. 62). (See fig. 20.)

"A diagonal or twilled plaiting is secured by passing the [elements] over and under . . . in other combinations, such as over two and under two, over one under two The passage is alternated row after row so that a variety of angular, diamond, and diagonal patterns results" (ibid., pp. 62-63). (See fig. 21.)

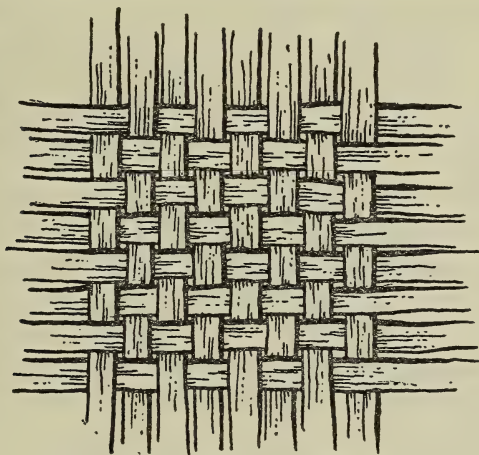


FIGURE 20.—Details of weaves: Plain plaiting.

BACKGROUND

"The acme of the northern Algonkin weaving is in twilled matting," says Mason (1904, p. 374), adding, "The operation, technically, is just on the border between free-hand plaiting and loom work."

The community of Nett Lake, on the reservation of the same name a little south of International Falls, by its remoteness has preserved this ingenious craft. Here lives Mrs. Peter Goodsky (*Běb ũ ma bik'*,

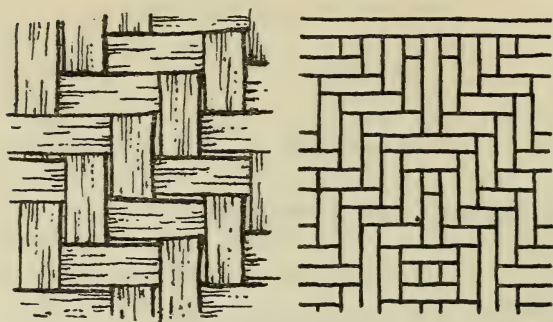


FIGURE 21.—Details of weaves: Twilled plaiting. (Courtesy Denver Art Museum.)

‘The snow is all over everywhere now’), formerly Edith Johnson.¹ Born across the lake to the south, she has lived on the reservation all her life, which she believes is 83 years (in 1957), and has been a widow since 1936. Only two of her nine children grew to maturity. Both of them assisted her with weaving and acted as interpreters: Annie (Mrs. Robert Strong), who was fairly familiar with the technique, and Lillian (Mrs. Tony Harding).

Constantly surrounded by three generations of descendants, she acts as matriarch of the household. Her wishes meet prompt and unquestioning compliance. At all times she carries pinned to her dress the key to the sturdy log storage building. Her industry is extraordinary, whether she is engaged in domestic duties, the braiding of rugs, or the weaving of cedar-bark mats and bags to supplement her income.

Her age no longer permits her to walk to the cedar grove several miles away, although she still goes half a mile into the woods for a little cedar. She learned matmaking by watching her mother, and she is respected in the community for her good weaving. Many residents referred to her as the only one who makes mats. “The old women are dying—three last winter. The younger don’t think it worth the time they put in. It’s a lot of work. Cedar trees are getting scarce.”

The writer found no recollection of the former manufacture of cedar-bark mats in any other area of Minnesota except Grand Portage Reservation, at the northeastern tip of the State. Densmore (1929, p. 122) finds them at Mille Lacs Lake; Cooper (1936, p. 16), at Rainy Lake; Reagan (1924, pp. 119–120; 1928, pp. 245–246), on Bois Fort (Nett Lake) Reservation; and Mason (1904, p. 374), at Grand Marais on Lake Superior—all in Minnesota. Volney Jones (1948, p. 341) reports them for Garden River Reserve, Ontario, near Sault

¹ Mrs. Goodsky died in May 1962.

Sainte Marie; Jenness (1935, p. 14) for Parry Island in Georgian Bay, Lake Huron; Chamberlain (1888, p. 155) for the Mississauga (Chippewa north of Lake Ontario); and Skinner (1912, p. 127) for the Northern Saulteaux (Chippewa east of Lake Winnipeg and considerably north of Lake Superior).

GATHERING MATERIALS

Mrs. Goodsky determined the time for stripping cedar bark (*gish' gi gōōb*) by testing a tree "when it gets warm in the spring, when the sap is up in the tree, any time in late May or in June." Densmore (1929, pp. 122, 123) finds it "can only be gotten in the spring" at Mille Lacs Lake in central Minnesota, and that mats were made there just before bulrushes were ripe for floor mats. She also states for Minnesota and vicinity (1928, p. 386) that "it was customary to gather as much bark as possible in June or early in July as the bark is more easily removed at that season." Lyford (1953, p. 93) reports "the middle of May to the middle of June, according to the season," for Ojibwa in general. Jenness (1935, p. 14) mentions midsummer on Parry Island. Volney Jones' very helpful study of cedar-bark mat technique (1948, p. 343) endorses removal "while the sap is flowing actively The most favorable months are June and July, when it 'slips' readily." The bark gathered in early August at his instance proved satisfactory, although "the bark 'stuck' on two trees." Possibly the inferior quality noted in his finished mat is due partly to the lateness of the date. Mrs. Goodsky said cedars used to abound in the community when she was young, but now she found them in a section of the woods a few miles east of her home where both cedar and birch grew so thickly that they produced the desired kind of growth—trees straight, slender, and tall, with few low branches. Volney Jones (1948, p. 343) reports preference for larger trees, "for the bark can be obtained from them in larger strips and is said to be tougher."

Densmore (1928, p. 377) lists "*Juniperus virginiana* L.—Red cedar" for mats. Lyford (1953, p. 91) calls it "*Juniperus virginiana* var. *crebra* Fernald and Griscom." Jones (1948, p. 342) gives "white cedar or arbor vitae, *Thuja occidentalis* L., and the present study concurs. Red cedar was available only to those Chippewa east of Lake Superior.

Mrs. Goodsky's equipment was a hand ax (*wa go glkwōōdt'*), while a double-bitted ax was used by her daughter. From life-long habit the octogenarian brought her packstrap, even though she had been assured that she would be exempt from burden bearing.

After all branches within reach are cut off, a horizontal cut about 1½ inches wide is made through the bark between 16 and 24 inches

above ground, where the trunk has a diameter of 4 to 6 inches. With the blade of the ax as a wedge, the bark above the cut is loosened enough to allow the fingers to grasp the bark and pull off a short vertical strip. This is removed to enable the fingers to grasp the next strip from the side.

Another cut 3 to 4½ inches wide, but usually 3 to 3½ inches, is made to the left of the first one. The ax pries the bark loose above the cut and for a few inches up the right edge of the bark, which is grasped with both hands, the right hand at the side. A sharp pull peels the bark for 12 to 16 feet up the tree. Strips are peeled off the rest of the tree in the same way. Nine trees were peeled for the mat in this study. Jones (1948, p. 343) reports a similar process, but finds that stripping only two-thirds of the bark from seven trees ranging "from six inches to one foot in diameter" provides sufficient bark because the strips are "from twenty to twenty-five feet long."

Mrs. Goodsky took advantage of the opportunity to gather other forest products unrelated to the mat. She peeled birchbark by making an 8- to 12-inch vertical cut, prying loose the bark to the left with the ax, and pulling off the bark from the whole circumference of the tree. This procedure was repeated above as high as she could reach. She also pushed over a punky poplar trunk and broke it into firewood-sized pieces to use in smoking a deerhide. Then, oblivious of thick swarms of mosquitoes, she sat down on the ground to begin preparing the cedar bark.

The heavy outside bark is stripped off at once and discarded. A strip is folded sharply near the center, cracking the rough bark on the outside of the fold. The worker grasps one edge of the cracked bark in her teeth and pulls the inner bark away from herself and downward for several feet (pl. 43, *a*). With teeth and fingers the bark is separated to the end of the strip, and the process is repeated for the other half. When about six strips are done, the ends of the strips of inner bark are laid one upon the other and the strips rolled into a loose coil, being straightened as they are coiled. The coil is flattened and tied with a piece of bark. Five bundles about 15 inches long were gathered in this instance. This amount can be carried in one load with a packstrap. An hour in the woods is required for three people to gather and prepare the materials as described.

The process noted by Volney Jones (1948, p. 344) differs substantially only in one respect. After the rough outer bark is removed "the remaining, more flexible, portion of the bark was further divided . . . so that the coarser, dark-brown, outer layers were detached from the softer inner layers of lighter color." Instead, Mrs. Goodsky, as hereafter described, scraped this coarse bark off with a knife, and split

the remaining strip into two thicknesses. The two studies agree on the length of time used so far.

Bark for dyeing part of the mat an orange color is obtained from the speckled alder (*ũ dop'*) (*Alnus rugosa* (Du Roi) Spreng). Mrs. Goodsky found this tree in the woods near her home, and with the assistance of her daughter she cut down six trees, trimmed off the branches, and carried the trunks home in 30 minutes' time. Trunks 4 to 7 feet long and 1 to 1½ inches in diameter are used.

The bark (*wũn ũ gĩk'*) is immediately scraped off with a knife; it peels easily while the sap is abundant. The longer strips are cut up to fit into a large kettle. The dye is derived from the inside bark, which has a rich orange color, but the outer gray bark is not separated from the inner. For this study, about one-sixth of a bushel of bark was stripped off in half an hour. Meanwhile an assistant built a fire under a kettle which was suspended by a chain from a "*wigiwam*" (tripod) behind Mrs. Goodsky's house.

The bark is just covered with boiling water and boiled for about 30 minutes. The kettle is then removed from the fire and the dye bath is ready.

Mrs. Charles Strong, a former matmaker also from Nett Lake, concurred in the use of alder, and named three other natural dyes with which she boiled cedar-bark strips: for yellow, willow ("the ordinary willow that grows in the swamp"); for black, "mud from the spring"; for red, "red willow," identified by Densmore (1929, p. 145) as *Cornus stolonifera* Michx., the common name of which she gives as redosier dogwood (1928, p. 369). Mrs. Goodsky's family chaffed her for using black commercial dye. She said the spring with "black mud" was a long way off. Her usual process was said to consist of boiling oak, willow, and red dogwood barks in a little water, dipping the strips into the dyebath, and covering them with mud from a certain spring. She could recognize the right spring by the bluish clay and the black color of a stick that had fallen into it.

Densmore (1929, p. 157; 1928, pp. 370, 372; 1928, p. 371) tells how strips may be dyed dark brown, black, or red, respectively, with natural dyes; Jones (1948, p. 347), dark red. Mason (1904, p. 374) mentions three colors in a mat, one natural. Cooper's (1936, p. 16) is undyed. Lyford (1953, p. 93) says, "The natural color was a beautiful golden shade," and this writer agrees.

In addition to the two barks, two kinds of ashes (*ĩsh ko dẽ' bĩn gwĩ*) are obtained: birchwood (in this instance about 2 quarts removed from the cookstove into a basin) and cedar bark (the residue of burning the scraps of bark left from the process described immediately below).

PREPARING MATERIALS

To retrocede, as soon as Mrs. Goodsky reached home with the wide cedar-bark strips (*mǎn dǐ tdo'*), she sat down in her customary place in the yard—an overturned washtub padded with a folded piece quilt. When the mosquitoes became troublesome she built a small fire to windward, using green wood to produce a smudge. In making narrow strips (*ǔ gash' i ñǎ*) for weaving, her only tools were scissors and a kitchen paring knife with an unusually long blade, pointed, curved on one edge, and nearly straight on the other. The length and width desired for the mat (*gǐsh gōōb' shǐ mǎn* in this study; according to Cooper (1939, p. 16) *kǐjikepicimǎn*) is now decided upon, and strips of bark about 4 inches longer than each dimension are set aside as measuring sticks.

The process used on each wide cedar-bark strip is this: More coarse, loose, outer bark is removed with the knife, and the bark is measured by one of the measuring sticks and cut off with scissors or knife. At a point halfway between the two ends of the strip the point of the knife is inserted and quickly drawn away from the worker and toward the right, slitting the strip. Similar cuts are made until the wide strip is cut into weaving strips five-sixteenths to seven-sixteenths of an inch wide. This process is repeated for the other half. Now all dark bark that can be readily scraped off is removed, with the teeth assisting. The edges are trimmed more evenly. Next each strip is split into two layers, the inside surfaces to be used as the front of the mat because of their uniform creamy whiteness, and the outside as the back because of remnants of dark bark and a color varying from light yellow to light tan. The splitting is begun with the knife blade at one end of the strip. One split end is put between the teeth, and the other is pulled downward and away from the worker, forming two strips (pl. 43, b).

When 34 to 44 strips of the same length are finished they are tied together at one end with a bit of bark and hung over a line to dry. If they are not dried at once, they are said to turn brown. They can be stored indefinitely or used at once, and dyed later or immediately. Fragments may be gathered into bundles to be used in making small bags.

In the long midsummer twilight characteristic of high latitudes, Mrs. Goodsky cut strips until after 9 o'clock. She worked about 6 hours, while her daughters assisted her for about 4 hours. Perhaps because of their inexperience, they were less skillful and quick than their mother.

Jones (1948, p. 345) records several divergencies in the preparation of the strips. Instead of slitting the wide strips with the point of a knife, utilizing the straight grain of cedar, his informants cut them with scissors. They omitted the use of a measuring gage and did not hang the strips up to dry. Rather than splitting the entire strip into two layers, they thinned one end to half its thickness for about 4 inches, and tapered the other end to a point. They made 100 long and 46 short strips in 3 hours as compared with Mrs. Goodsky's 175 long and 81 short strips in 10 hours of time. (The two mats were to be nearly identical in dimensions.)

When the strips are finished and the alder dye bath ready, one bunch of the shorter strips is untied, coiled loosely, put into the dye (*ũ dis' sī gŭn*), and stirred with a stick until thoroughly wet. Next the strips are removed from the kettle with the stick and dropped into the smoldering ashes from the burned cedar-bark scraps. This process is repeated for a second bunch of short strips. They are then turned and stirred in the ashes, placed on a piece of cardboard, sprinkled with birchwood ashes from the basin, turned over once, and sprinkled again. They are covered with a cotton blanket for perhaps 5 minutes, turned over, and re-covered for another 5 minutes.

A few strands are returned to the dye bath to become wet enough to dampen the rest when mixed with them. Again they are all covered for 5 minutes. The dampening and covering are repeated. Mrs. Goodsky was not satisfied with the way the dye was taking, and thought the water had not been hot enough. Her family said there had been too much water in the pot. She decided to give the strips more time. She returned all of them to the pot, wetting them thoroughly. She removed them to the cardboard (pl. 43, *c*), sprinkled them with cedar bark ashes, and covered them. She added more birchwood ashes, and covered them again. She then returned them to the dye bath, removed them, sprinkled them with birchwood ashes, and covered them. Now satisfied with the color, she picked the strips out singly, tied them into two bunches, and hung them up to dry (pls. 43, *d*; 46, *b*). Then she washed her hands thoroughly with soap and water.

The dyed strips were somewhat mottled and of varied shades of orange. Whether this was a normal condition or due to the trouble encountered, the variety added texture and interest to the finished mat.

An equal number of short strips were dyed black by dipping them into a deep pan in which Mrs. Goodsky had dissolved a package of commercial dye. She partly submerged them, turned them over, covered them with rags for a few minutes, and then repeated the

process a few times. When the color was uniform and satisfactory, she rinsed them in clear water and hung them up to dry.

By this time several of her grandchildren and their families had arrived from cities at some distance from the reservation for a visit. None of the score of young people had ever witnessed this process. An appreciative audience watched "Grandma" making a mat and exchanged banter over it.

Jones (1948, p. 347) describes in detail the process of using bloodroot for dyeing a mahogany red color. This process differs in some respects from that of the present study. Instead of boiling the vegetable matter for half an hour, removing the kettle from the fire, and steeping the loosely rolled strips, Jones' informants boiled the roots with the tightly bundled strips for 15 minutes, rinsed the strips, and hung them up to dry. No mordant was employed.

FIRST ROW

As soon as the dyeing is completed, the next step begins. Several informants had told us they could make a mat if only someone would do the first row. Therefore, this selvedge seems to be the key to the entire process.

A chair is placed in front of the weaver to which she may tie one end of her work, keeping a moderate tension by having someone move the chair farther away whenever the work sags much in the center. Heavy cotton twine from a ball is wound twice around a chairback rung and tied in a bow, leaving an end to the right of the chair equal to the desired length of the mat plus the width. The ball is on the left. A bunch of short strips of each color is laid near the worker and untied. If the strips are not damp from dyeing, they are sprinkled with a little water.

The twine between the chair and ball forms the foundation for the first selvedge. Mrs. Charles Strong used a strip of cloth instead of twine. Jones (1937, p. 12; 1948, pp. 344-345) mentions the use of twisted two-strand basswood cord for the border, and it is likely this was commonly used in earlier days. The twine close to the chair is pulled toward the worker with the left hand. One strip is laid across the twine at right angles to it with a 2-inch end of strip protruding above the string (fig. 22; pl. 44, *a*). This end is bent down and away from the worker, then across the strip and toward the left in a slightly diagonal direction (fig. 23). It is held against the string by pressing it between the left thumb and forefinger. With the right hand another strip is placed beside the first so as to conceal part of the end of the preceding strip, and the process is repeated, both ends now being held by the left fingers. When a third strip is added, all three ends are

held. Thereafter there are only three, because the end of the first has been passed by as the work proceeded (fig. 24).

Before Mrs. Goodsky reached the length desired, she discovered she had not dyed enough strips. Therefore after repeating a series of nine orange, nine black, and four natural strips eight times, she ended the top selvedge. To do this, the three remaining ends are temporarily tied together with a bit of string. A length of twine is left attached to the first row to equal the width of the mat, and the twine is cut from the ball. The appearance of the mat at this stage is best suggested by the question of Mrs. Goodsky's 6-year-old television-wise great-grandson: "What is Grandma making—a hula hula skirt?"

Jones' informant (1948, pp. 347-349; figs. 2, 3), contrary to Mrs. Goodsky, worked from left to right, stood while working, pinned

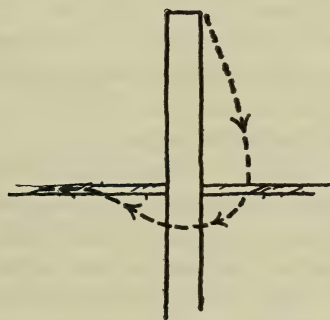


FIGURE 22.—Cedar-bark mat selvedge: Strip laid across cord.



FIGURE 23.—Cedar-bark mat selvedge: Strip brought across itself.

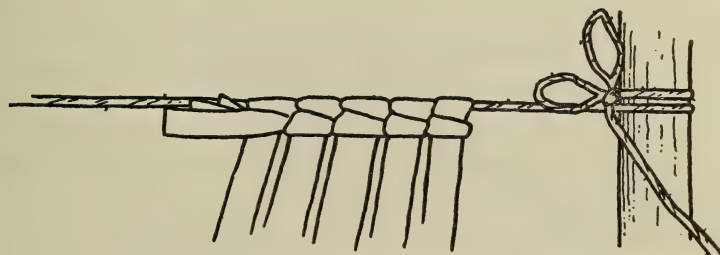


FIGURE 24.—Cedar-bark mat selvedge: Selvedge begun.

the string to the wall of the house, and occasionally lightened the pull of the warp on the string by looping the finished part over the pin.

WEAVING

The completed selvedge is now lashed to a straight pole (*ũ p̄sh' i m̄ñ ni kan nak' kan*) about $1\frac{1}{2}$ inches in diameter and 16 inches longer than the desired width of the mat. The lashing begins at the piece of twine tied to the chair, which is now instead tied with a bow to a place 4 inches from the end of the pole. Four inches beyond, a piece of ordinary string is wrapped twice around the pole and the twine, tied in a slipknot, and thereafter wrapped around the pole and selvedge after every two or three strips (fig. 25). As work progresses the end of the pole where this work began rests on the ground in front of the worker, the unused part under her left arm and behind her. The string is passed under the pole with the left hand and pulled upward and toward the worker with the right. The completed lashing is secured by wrapping the string three times around the pole and first row just past the last strip and tying in a slipknot (fig. 26). The twine at the beginning end is untied from the pole.

To make a support for the work during the weaving, two fairly straight poles about $1\frac{1}{2}$ inches in diameter and 7 feet long are driven into the ground at a distance apart about 8 inches less than the length of the crosspiece. This piece is lashed to them at a height which the weaver can easily reach. The piece of twine at each end is now wrapped two or three times around the nearest upright at a point

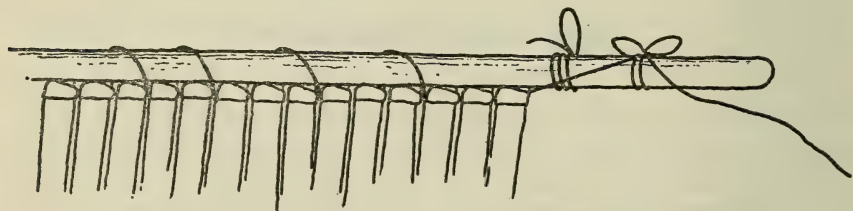


FIGURE 25.—Cedar-bark mat selvedge: Selvedge lashed to pole.

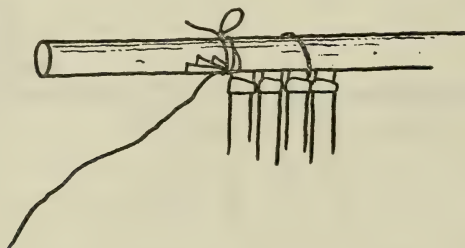


FIGURE 26.—Cedar-bark mat selvedge: Lashing tied.

about 12 inches below the crosspiece, and tied in a bow. This twine serves as the foundation for the selvedge at each side, while the hanging strips become the warp for the weaving proper.

Mrs. Goodsky's son-in-law set up and tied the frame for her. This was the only part of the procedure in which a man took part.

In Jones' study (1948, pp. 342-346; fig. 1; p. 350; pl. 1, fig. 1) the weaver's son-in-law gathered the bark, removed the outer bark, and erected a frame made of heavy two-by-fours nailed together and fastened to the ceiling beams for support. It was erected before the selvedge was lashed to the crosspiece, but Mrs. Goodsky attached her selvedge while the light crosspiece was free and conveniently handled. If Jones' figure of 6 feet for the height of the crosspiece were correct, it would be difficult to attach the selvedge or to weave. The height indicated in his photograph appears from the length of the strips to be closer to 5 feet, or to the top of the weaver's head. Better work could be done with a movable crosspiece like Mrs. Goodsky's, by which the weaving could be kept at a convenient height as work progressed.

The weaving starts at the left end where the top selvedge ended. The three short ends are untied, bent down at a right angle to the first row, and fastened to the vertical twine by the end of the first weft strip in the same way as were the ends in the top selvedge. The strip is then woven in plain plaiting under-one-over-one (see fig. 20) to the right edge, where the end is trimmed with scissors to about 3 inches and secured to the vertical twine by the same stitch as began the top selvedge, except for a reversing of the direction. Thereafter as either end of a row is reached, the short ends of the preceding work are concealed and carried along as in the top selvedge. Work is from left to right, with the right fingers lifting a warp strip, pulling it a little to the right, and laying it over the weft strip, the left thumb and fingers keeping the previous work flat and tight (pl. 44, *b*). When the left hand is holding about six warp strips, it moves ahead.

To prevent cracking, the materials must be kept slightly damp. Spare weft strips are coiled in a pan with a little water in the bottom and at times patted with a damp cloth. The unwoven warp is dampened by occasionally dashing on it a little water from a cup. When the sun shone on the mat, Mrs. Goodsky had the frame uprooted and leaned against the shady side of her house.

After the first two rows are done the mat is kept straight by fastening it to the side poles by a bit of narrow bark slipped between the side selvedge and the first warp strip, and tied around the upright pole. The work is so tied about every 4 inches. As work progresses the twine for the side selvedges is also tied lower on the side poles, about 8 to 11 inches below the point which the weaving has reached.

To prevent sagging of the weft when work temporarily is halted or as the mat nears completion, a warp strip is bent double about an inch below the last weft row and pushed up between the last two weft strips from behind, every 3 to 6 inches across the row. They are pulled down as work proceeds. Mrs. Goodsky removed the crosspiece from the uprights, laid the mat on the woodpile in the shed, and locked the door, when she stopped for the night.

When a point is reached where the weaver has to stoop, the horizontal pole is raised to near the tops of the uprights. This move necessitates readjusting the bark ties along the side, which no longer fit because of irregularities in the uprights.

Occasionally a weft strip breaks, particularly when being fastened into the right-hand selvedge. A few inches are then ripped back and another strip inserted. Thus a double strip is carried along for a few inches.

Three variations occur in the weaving of Jones' mat (Jones, 1948, pp. 350-352, fig. 1). From the first, the cords for the side selvedges "are allowed to hang slack to below the level of the lower ends of the warp, where they are tied around the uprights." Mrs. Goodsky's were never tied more than 12 inches below her weaving, and were taut. This may have helped to keep the side selvedges straight. Her device to prevent sagging of the weft was apparently unknown to the other woman. Jones' weaver believed "it is necessary to tie the strip ends in place after each attachment [of a weft strip], for otherwise they will come loose." Such tying was not done by Mrs. Goodsky, probably because her more pliable and narrower strips (about half as wide) could be pulled more tightly at the selvedge.

Jones' mat (*ibid.*, pp. 350-351; pls. 1, 2) and Cooper's mat (Cooper, 1936, p. 16) are done entirely in plain plaiting. By twilling (carrying a weft strip over more than one warp strip at a time—see fig. 21) and combining colored strips, a great variety of patterns may be obtained. Densmore (1929, pls. 1, *a*; 61, *b*) shows two zigzag patterns and Mason (1904, pl. 122) another. He says (pp. 374-375), "For a few rows the weaving is simple checkerwork of the plainest kind, and then begins a series of twilled patterns over two and under two. But even this simplest technic so lends itself to charming effects of light and shade that there is not a monotonous square inch on the surface" (pls. 56, *a*, *b*; 59).

Mrs. Goodsky chose to use a diamond pattern on the colored strips (pls. 45, 46, *a*). For this, all weft strips were undyed. Before reaching the lower edge she saw that she had not prepared enough long strips to make the size of mat desired. Therefore, on completing a pattern unit she cut off 7 or 8 inches of warp, leaving about 4 inches

surplus. She relied on her memory, like Densmore's informants (1929, p. 194) who "have the pattern in their heads." Working in the oppressive mid-day heat, she noticed she had inadvertently omitted one diamond of the pattern. She pointed it out to bystanders, chuckling at her error, but was unable to remedy it because the ends were trimmed at the selvedge. Apparently she gaged her design by the work above it rather than by counting strips, for the next diamond below her error was out of line.

The twine is now untied from the right upright and pulled toward the left, to form the basis for the lower selvedge. The edging stitch is continued from the right selvedge across the lower edge, while the 4-inch ends are carried along pointed toward the left. About every third end is tapered by a long cut, to prevent too thick a selvedge. At the lower left corner all the ends are tied together firmly with several turns of sewing thread and several knots. Then the ends are cut off to one-half of an inch in length.

Jones records (1948, p. 353) that while the lower selvedge was being made its cord was stretched between two nails in the upright posts. Whatever the reason for this, it resulted in surplus cord at the left corner, which "was looped around the border of the mat a couple of times, tied, and cut off." However, the other corner was neatly finished in a braid turned under the mat and bound there.

Mrs. Goodsky's upper and lower selvedges both run in the same direction, from the weaver's right to her left. A mat by left-handed Mrs. Charles Strong that is in the writer's possession and Jones' mat (1948, fig. 4) have both selvedges running left to right. Side selvedges of necessity run from the top toward the bottom.

Dyeing and weaving had taken Mrs. Goodsky 12 hours, plus about 6 hours' assistance from her daughters. The entire work of making a mat 3 feet 1 inch by 5 feet 4 inches had consumed about 20 hours of her time and 13 hours of her assistants' time. Considering her diligence, it is surprising to find Mason's report (1904, p. 375) of a mat "6 feet 5 inches long and 4 feet 5 inches wide" that was made "in a single day, the work beginning at 9 o'clock in the morning and the finished product being delivered 2 miles away at 4 o'clock in the afternoon." In 1956 another informant, Mrs. Charles Strong, who had completed the first selvedge row on a mat that was to be a little over 3 by 5 feet, asserted she would begin the weaving in mid-afternoon and complete it by the evening of the following day. This is longer than Mrs. Goodsky's time. Probably Mason's worker had, like Mrs. Strong, completed all but the weaving proper in advance. Possibly quality was sacrificed to speed. The time could also be shortened with an assistant, or two of them such as Jones' weaver had (1948, p. 350-351),

one working at each side selvedge and one doing the weaving between. His workers used 11 man-hours for the dyeing and weaving process, while the present study shows 18. However, in chronological time the figures are 5 for three weavers to 12 for two. Total man-hour figures for the mat are 20 to 33.

Densmore's procedure (1929, pp. 156-157; pls. 1, *a*; 61, *b*) is essentially like Mrs. Goodsky's. Lyford (1953, p. 93) corrects Densmore's obvious error of $1\frac{1}{4}$ inches as the width of strips to $\frac{1}{4}$ inch, but repeats Densmore's statement that the edges "were turned and 'sewed over and over' with narrow strips of cedar." The unfinished mat pictured by both appears "sewed over and over" in the unrolled portion, for the reason that this is the way the selvedge always appears on the back. Its front, clearly visible on the rolled portion in Lyford's more enlarged picture (1953, pl. 51), uses the interlocking selvedge described above. The two sides of the mat in the present study are shown in plate 45.

William Jones (1906, p. 142) in a brief summary concurs with Mrs. Goodsky in the process used, but Mason (1904, p. 374) says that "the weaving is done from below upward," and that "the warp strings are suspended freely [over] a small rod or stiff cord of bark." Both these statements would apply to the making of a cedar-bark bag, which hangs upside down during weaving (Densmore, 1929, pl. 64, *b*) and of which Lyford (1953, p. 86) says, "The strips of fiber are hung across a single stick." Mason's picture (1904, pl. 122) confutes his first statement applying to a mat and makes the second highly unlikely. Other minor differences in Mason's process are the use of forked upright sticks and the long loops by which the mat is suspended. No indication of weaving technique is given by Chamberlain (1888), Cooper (1936), Jenness (1935), or Skinner (1912). In the absence of evidence of any other process of making cedar-bark mats, the writer assumes that they refer to mats made in the way described herein.

USE OF MATS

Mrs. Goodsky wove her beautiful mats to sell. In an earlier day she might have used them to sleep on, and as carpets, dining tables, partitions, or doors (Lyford, 1953, p. 93), "in the drying of berries and other foods in the sun and as a shield for the fire in the smoking of meat" (Volney Jones, 1948, p. 360). She remembers that when she married and came to Nett Lake about 1897 the people lived close to the lake with cedars all around and lined the walls of their wigwams with bright cedar-bark mats.

Additional data on these mats are found in the following section under "Predominance of rush over cedar-bark mats."

RUSH MAT (RECTANGULAR)

TECHNIQUE: PLAIN PLAITING AND POSSIBLY TWINING

“Plain plaiting is made by passing the elements over one and under one” (Lyford, 1953, p. 62). (See fig. 20.)

Of twining Lyford says (1953, p. 77), “The weft threads were arranged in pairs to cross the warp [elements]. One weft thread was carried over a warp [element]. . . . The other weft thread passed behind the warp [element]. . . . At each intersection the two weft threads were twisted half way around each other enclosing the warp [element]” (fig. 27).

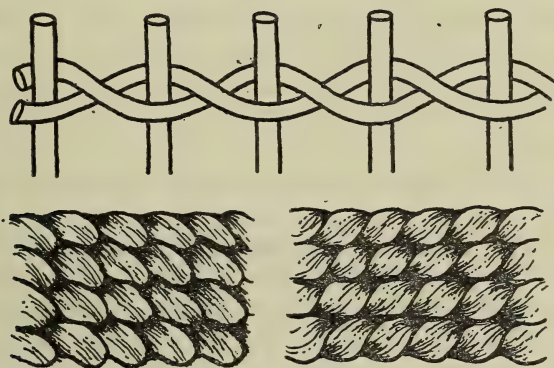


FIGURE 27.—Details of weaves: Twining. (Courtesy Denver Art Museum.)

Lyford twice cites the use of twining for rush mats (1953, pp. 69 and 90), but her statements are unsupported in either her text or her bibliography. If the Chippewa indeed used twining, these are their most complicated mats, comparable to the twined yarn wallets among their bags. It seems reasonable that a few skillful weavers may have transferred the twining complex from bag to matmaking, just as they applied it to the weaving of rag rugs (Lyford, 1953, pp. 93–95; Coleman, 1947, p. 38; pls. 7, *a*; 8, *a*—mistakenly called a rush mat), bulrush baskets (Mrs. Maggie Skinaway Wadena, oral communication to the writer, July 16, 1961), and bark bags (Densmore, 1929, pl. 55, *a*).

DEFINITION OF TERMS

The distinction between the second major mat and the third, that of cattails, is in need of clarifying. Writers have confused us by a multiplicity of names for each mat. Rush mats are called “reed” by Densmore (1929, pp. 123, 156; pls. 60–61); Hilger (1935, p. 41;

1939, pp. 158, 159; 1951, pp. 136, 137); Kohl (1860, p. 10); Lyford (1953, p. 19, pl. 78); Reagan (1924, pp. 118, 119); Winchell (1911, p. 588); "flag reed" by William Jones (1906, p. 142); and "grass" by Boyle (1898, fig. 32).

Cattail mats are designated "rush" or "bulrush" by Bushnell (1919 a, pl. 2, *b*; 1919 b, 614; 1922, pl. 12, *b*); Beaulieu in Clark (1885 p. 376); Densmore (1929, pp. 12, 21-24, 119, 120); Henry (1897, p. 133); Hilger (1939, p. 45; 1951, pp. 136-140); Jenks (1900, pl. *lxix*); Jenness (1935, pp. 112, 113); Kane (1925, p. 4); Radin (1928, p. 663); Snelling (1936, p. 69); Thayer (1940, p. 97); Thompson (1916, pp. 246, 247); and Warren (1885, p. 40).

They are called "reed" by Clark (1885, p. 113), Densmore (1929, p. 157), Jenness (1935, p. 113), and Winchell (1911, p. 586); "cat-tail flag" by Reagan (1924, p. 117), James in Tanner (1830, p. 55), and Winchell (1911, p. 586); "flag" by Peter Jones (1861, p. 72) and Willoughby (1905, pp. 85 and 89); and "grass" by Mooney and Thomas (1907, p. 279).

Several general reference sources consulted ("Dictionary of American English," 1944; Funk and Wagnall's "Standard Dictionary," 1960; Webster's "Third New International Dictionary," 1961; Gray's "Manual of Botany," 1950), while allowing wide latitude in the meaning of some of the terms noted just above, agree in limiting the use of "cattail" to some species of *Typha*, the plant commonly recognized by its furry spike resembling a wiener on a stick and found in watery ground. In this they bear out the usage in sources devoted primarily to the botanical aspect of Chippewa culture, such as those of Densmore (1928, p. 378), Gilmore (1933, p. 124), Reagan (1928, p. 245), and Smith (1932, p. 423). This usage is followed in this paper.

While the general reference sources mentioned do not show unanimity on the meaning of "bulrush," they usually mention for the United States some species of *Scirpus*, the leafless plant commonly encountered standing like a whip in the shallow water of a lake. For the large rectangular mat, the bulrush or rush, as *Scirpus validus* Vahl., is concurred in by Densmore (1928, pp. 293, 295, 378), Gilmore (1933, p. 124), Kinietz and Jones (1942, p. 525), and Smith (1932, p. 418). In contrast to this soft-stem rush, the hard-stem variety, *Scirpus acutus* Muhl., was found for the mat in this study.

The student may judge for himself what mat is intended when various terms are used, only if he knows some of the differences between the two types. (See checklist for distinguishing rush and cattail mats at the end of "Cattail Mat" section, p. 264.)

The Chippewa terminology, too, is in need of clarification. References to mats frequently employ some variation of the word "*a pūk'we*," which this writer finds as "*ũ pūk'we*." Longfellow confuses the meaning in the familiar lines in "The Song of Hiawatha" (1898, canto IV, ll. 175 and 181) :

But the ruler of the West-Wind . . .
Seized the bulrush, the Apukwa.

That the poet intended by "Apukwa" the cattail and not the bulrush as we are using the word here is apparent from later lines which locate it in "the margin of the meadow."

The derivation of *a pūk'we* according to Densmore (1929, p. 21) is "*apūkwa*, 'to lap on to.' " The allusion is to the overlapping of the mats used to cover the framework of the lodge. The cattail or birchbark mats used for the sidewalls lap horizontally like modern siding, while the birchbark roofing mats lap over the upper edge of the sidewalls and over each other like shingles. Thus the strict meaning of *a pūk'we* is "lodge cover." From it, apparently, is derived the name for the cattail plant, found by this writer to be *ũ pūk wesh' kwe ũk*, by Smith (1932, p. 423) to be *abūkwe' skwe*, by Tanner (1830, p. 55) to be *puk-kwi*, and by Gilmore (1933, p. 124) to be *pokwiššk*, which he says "is derived from *pokwan*, 'roof'+*wišškok*, 'grass.' " Densmore gives (1928, pp. 294, 297) *apūk'we* for the cattail plant. It appears also to be loosely used to indicate cattail mats as distinguished from birchbark mats, which have their own appellation *wi' gwas* (birchbark) *apūk'we* (Densmore, 1929, p. 12).

The writer finds the Chippewa word for rush mat to be *ũ na'kũn*, sometimes given as *nākōn* (Hilger, 1951, p. 136) or *a na'kũn* (Densmore, 1929, p. 21), which is also used for the bulrush plant (Densmore, 1928, pp. 293, 297). Lyford (1953, p. 88) notes *ana'kanashk* for bulrush; Smith (1932, p. 418), *jīka'miūsūkũn*; Kohl (1860, p. 10), *Kitchi Gamī-washk*, 'Great Lake bulrush'; and this writer, *ga mi' wūšhk*. Smith (1932, p. 418) gives *ana' ganūsšk* for rushes in general. Gilmore (1933, p. 124) says, "Great bulrush. *Nakunašškok*. The name is derived from *nakun*, 'mat,' + *wišškok*, 'grass.' "

BACKGROUND

The weaver of the second major mat, the rush mat (rectangular), is Mrs. Maggie Skinaway Wadena (*Bwa nes'*, 'Little Sioux'). Mille Lacs Lake, near the center of Minnesota, is the hub around which her 74 years of life have revolved. A fullblood Chippewa, she was born just south of that lake, near Lake Onamia. At the time of this study she was living with a younger couple, the Ole Sams. They had brought her from their home at Isle, on the east shore of Mille Lacs, to the road-

side stand where they sold their birchbark work in the summer, on the west shore. Four years earlier, in 1957, she had made a cattail mat for the writer near Glen, north of the lake.

Mrs. Ole Sam (Maggie Bedausky) acted as interpreter, assistant, and eyes to the dim-sighted older woman, while Mr. Sam assisted in gathering and processing the rushes and bloodroots. Both of the Sams remembered watching their mothers make bulrush mats. Mrs. Wadena, who had learned the technique from her mother, had been producing a mat or two each year, notably for use in the Mide lodge.

Aside from Mille Lacs, the writer found evidence of former mat-making only at Nett Lake, Red Lake, and Ponsford on White Earth Reservation. Rush mats are reported at Mille Lacs by Densmore (1929, p. 154) and Coleman (1947, pl. 8, *b*; the rag rug in pl. 8, *a*, is erroneously called a rush mat); near the mouth of the Winnipeg River, Manitoba, by Kane (1859, p. 71); on White Earth and Red Lake Reservations by Densmore (1929, pp. 155, 156; pl. 1, *b*) and Hilger (1939, pp. 145, 158, 166; 1951, p. 137; 1935, p. 41); at Leech Lake by Smith (1932, p. 418); on Manitou Rapids Reserve, Ontario, southwest of Rainy Lake (Densmore, 1928, p. 370); on Bois Fort Reservation by Reagan (1924, pp. 118, 119); at Basswood Lake on the Minnesota-Canada border by Bushnell (1919 *b*, p. 613); at Grand Portage Reservation by Eastman Johnson (pl. 58 of the present paper); and in northern Minnesota by Whipple (1902, p. 42) and Gillfillan (1901, pp. 59, 62). They occur at La Pointe, Lac Courte Oreilles, and Lac du Flambeau Reservations in Wisconsin (Kohl, 1860, p. 10; Smith, 1932, p. 418; Hilger, 1951, pp. 136, 137); at L'Anse and Lac Vieux Desert Reservations, Michigan (*ibid.*; Kinietz, 1947, pl. 31; Kinietz and Jones, 1942, pp. 525-537); at Walpole Island Reserve, Ontario, south of Lake Huron (*ibid.*; Volney Jones, 1937, pp. 6, 12); and southwest and northeast of Lake Huron (Gilmore, 1933, p. 124; Boyle, 1898, p. 26—at Sturgeon Falls near Lake Nipissing).

GATHERING MATERIALS

Rushes inspected in Mille Lacs Lake were not found to be tall enough for use on July 16, presumably because of the low level of the water. In Whitefish Lake, a small and shallow nearby lake, they were tall and abundant, growing in about 2½ feet of water on a very mucky bottom. As Mrs. Wadena preferred thick rushes so that the weaving would proceed faster, effort was made to select this kind. The amount needed was guessed at. The length of the rushes ranged from 89 to 114 inches.

In harvesting rushes, a rowboat is taken out into the midst of the rushy area. Rushes are grasped with both hands and pulled up carefully so as not to crush them. Some come with difficulty or not at all,

and some break off. The roots of a few come with them, but usually only the entire stem comes up, including the white tip formerly eaten by the Indians.

Other accounts of the gathering of rushes agree essentially with this one. Densmore (1929, p. 123) observes that by the time the cedar-bark mats were made, bulrushes were ready. Kohl (1860, p. 10) says they "must only be cut at one period of the year, when they have attained a certain ripeness." Lyford (1953, p. 88) specifies that they were "gathered from canoes in late June and July after they were full grown." Kinietz and Jones (1942, p. 526) say, "midsummer, when they approach their maximum growth. At Walpole Island they were collected in early August. . . . The women waded into the water to get the stems, selecting mature plants of medium size"—from 5½ to 6½ feet long. The selection of rushes is pictured in their plate 1, figure 1.

Quality varied with the location. The writer learned at Red Lake, Minn., that rushes were not usable for mats and had to be imported from Cass Lake. Hilger (1935, p. 41) asserts this was because they were brittle in Red Lake. She notes (1951, p. 136), "Although the bulrushes growing near the edge of any lake or river were usable, the ones in small lakes were choicest since they were least brittle. Those grown in rivers were not used because of their shortness, unless lake grown ones were not available. Today, as in days past, rushes are pulled up by the roots or cut off with a knife." Smith (1932, p. 418) says "they are pulled, rather than cut, in order to obtain the maximum length"—a credible statement. He goes on, "They select long rushes, with small diameters, so that the pith content is small. When the mat is in service, such a fiber will not crush readily."

Mrs. Wadena had often used the bloodroot (Indian paint, *Sanguinaria canadensis* L., *m̄s go ji'b̄ik*) for dyeing some of the rushes for her mats. Her assistants entered a nearby woods where they had seen the familiar square white flower in early spring and searched until they found the characteristic round leaf. Shallow-growing roots the size of the little finger and bright red where injured are easily dug from the leafmold with the fingers. After being gathered they are washed at once, and the smaller, fibrous roots picked off. Six hours of work resulted in 3 quarts of roots.

PREPARING MATERIALS

When the harvesters arrive home with the rushes, they cut them to the proper size with a butcher knife. The 6-inch white end is removed and enough from the small end to leave whatever length of warp is desired, 59 inches in this case. The trimmed rushes are divided into

bundles of about 46 each, and tied in the center with a strip of *wi'gōōb* (inner bark of the basswood tree).

At once the rushes are started on the "cooking" process. Without this they are said to be brittle and to break. Mr. and Mrs. Sam and three assistants did this cooking. A large rice-parching kettle of cast iron is placed over a brisk fire and half a kettle of water is brought to a boil. Thereupon a worker seizes two bundles of rushes, stands the small end in the kettle at an oblique angle, and by encircling the other end with her arms uses her weight to press downward on the bundle (pl. 47, *b*). As the lower end wilts it curves to fit the contour of the kettle. When partly wilted the bundle is rotated so that the part near the surface of the water will be on the bottom.

When the rushes are wilted the bundle is removed and retied, this time at the small end. Now the thick end is placed in the water and subjected to the same treatment as the small end. Next, the entire bundle is immersed in the water, curling around to fit the kettle. With two sturdy forked sticks about 53 inches long, two workers press on the rushes and hold them below the surface. After boiling them about 20 minutes the worker tests them by hand. When she decides they are rubbery and soft enough and do not crack on bending, they are lifted from the kettle with the forked sticks and thrown on the ground to cool while the next lot is being processed. When cool enough to handle, a bundle is seized by the small end, swung over the head, and slammed forcibly on the ground. This frees the large end of most of the thin brown sheathing scales. The rest are removed by hand. The rushes are now a less intense green.

When "cooking" is completed, the rushes are spread out to bleach in the sun for a week until they are the color of old ivory. If the weather is rainy they are left bundled at the thin end and hung over a pole, so that air circulating through them may prevent molding. On sunny days the Sams spread them on the roof of a shed, turning them over once each day. Once bleached they can be kept indefinitely before use.

The gathering and cooking process consumed 18 man-hours of time. Apparently there was variance in the amount of cooking. Hilger (1935, p. 41; 1951, p. 136) says "until the green color has disappeared"; Kohl (1860, p. 10), "three-quarters of an hour. Without this process the reeds would become harsh and brittle." Kinietz and Jones (1942, p. 527; pl. 1, fig. 2) describe and picture a worker "standing the bundle in a wash boiler and pouring scalding water over the rushes several times. . . . Formerly it was customary to immerse the rushes in boiling water in a hewn wooden trough. . . . Rushes allowed to dry without such treatment are said to be brittle, less firm, and to

have a less desirable color." Smith (1932, p. 418) asserts that rushes were treated by being "immersed in water for a few days and then cleansed," and pictures them in plate 51, figure 1. Jenness, in an obscure reference (1935, p. 113) says they were "soaked for a week or more in cold water."

Kinietz and Jones (1942, p. 526) describe stripping the brown basal scales off at the time of gathering, and washing the stem "by swishing it through the water."

Hilger (1935, p. 41; 1951, p. 136) mentions the rushes as "being turned several times each day" during bleaching, and adds, "They are taken in at sunset before the dew falls—dew causes them to turn yellow while in the process of bleaching." Bleaching on a rack or a pole is described by Densmore (1929, p. 154), who on the next page adds they "were 'boiled up' before being woven."

On the day selected for weaving, the dye bath is first prepared. The bloodroot roots are broiled so that "the color will come out better." They are spread on a window-screen resting on four stakes over a small but hot fire. To prevent burning they are moved about by hand and by shaking the screen. They are ready for removal when they are heated through, softened somewhat, darkened outside, and intensely red inside (about 20 minutes). It was said that in earlier days they were buried in hot ashes. "They have to be baked, like bread."

The roots are next crushed until they crack open, by pounding each one lightly along its length with a hammer or pebble as it rests on a flat rock (pl. 47, *a*). They are put into a large kettle with enough boiling water to cover the rushes to be dyed, and are brought to a boil.

After a rain the preceding evening, the rushes had been placed in a storage shed to keep them damp for use. This assured the necessary dampness in the bundle to be dyed. Any too thick for use are culled out (there were eight in this case). The rest are divided into two parts, each of which is rolled into a coil 11 inches in diameter and tied with a strip of basswood bark. One coil at a time is immersed in the kettle, held down with a stick, turned occasionally, and simmered for 20 minutes. The result is a shade of yellow-orange resembling a light orange peel. The rushes are drained briefly on the ground, and covered with a blanket to keep them moist. An hour and a half served for broiling, crushing, and dyeing.

Mrs. Wadena described two other methods of dyeing rushes. The lead is removed from three indelible pencils, broken up, placed in boiling water with half a bundle of rushes, and thereafter treated as the roots were, except for boiling 30 minutes. A bright purple

color results which is often seen in mats made around the turn of the century.

The same process is used for "black mud," a blue-black clay sometimes occurring at the mouth of springs. Two quarts of mud and four strips of walnut bark are put in the kettle. The inside bark of the walnut tree is gathered in the same manner as the cedar described earlier. Strips about $2\frac{1}{2}$ inches wide are rolled and bundled before they are dropped into the kettle.

Reference to these and other dyes for bulrushes is found in the literature. Bloodroot is named by Hilger (1935, p. 41; 1939, p. 158; 1951, p. 136—two references) and Kinietz and Jones (1942, p. 528), but they call the resulting color red, contrary to the yellow-orange found in the present study. Hilger also (1951, p. 136) says "brown-orange." She elsewhere mentions the lead from indelible pencils (1939, p. 158). "Black muck found in certain ponds, a black color," is a dye listed by Hilger (1935, p. 41; 1951, p. 136—two references). Kinietz and Jones (1942, p. 528) speak of "a black earth, which we think may be peat, for a purplish black." Densmore (1928, p. 370) says, "A black earth which 'bubbled up in certain springs' was used in black dyes. . . . The Chippewa women buried their rushes in the black earth for a few days and thus secured a satisfactory black color."

Other substances are given for dyeing black (*ibid.*, p. 372); mahogany (Hilger, 1935, p. 41); yellow, red, purple, mahogany, green, blue, black (Hilger, 1951, pp. 136—137); brown (Kinietz and Jones, 1942, pp. 528, 529). Several substances to use in dyeing unspecified colors are listed by Hilger (1939, p. 158). There were differences in methods used: "One informant swished bulrush reeds in ashes. . . . Some informants boiled reeds in decoctions; others soaked them overnight. Boiling, said some, made them too soft." "The material used to make the dye was boiled in water which was later strained off. The reeds were then boiled in the colored water" (*ibid.*, 1935, p. 41; 1951, p. 137). Densmore says (1928, p. 369; 1929, p. 163), "Rushes are the hardest material to dye and often require several 'dippings' before the desired shade can be procured." This may be one reason that, although the vegetable dyes were "rich, but quiet in tone" (Boyle, 1898, p. 26), native dyes gave way to commercial (Densmore, 1918, p. 98; Hilger, 1935, p. 41; Smith, 1932, p. 418).

Rushes must be bleached before successful dyeing can be assured. Reports on the color after bleaching are in conflict: "pure white . . . ivory white" (Smith, 1932, p. 418), and "natural straw-color" (Boyle, 1898, p. 26). "Those prepared at Walpole Island [standing upright] appear to have been poorly cured," say Kinietz and Jones (1942, p. 528), "for they retain considerable green."

Basswood twine (*bi mĩ nũ kwĩn'*) for weft had been prepared the week before by Mrs. Wadena. To make enough for a mat, a melon-shaped ball 9 inches long and 6 inches in diameter, 62 hours was required by the visually handicapped woman. The armload of *wi'gõõb* needed had been purchased from a friend, who estimated that 5 hours went into its preparation. It is prepared by stripping off the dark outside bark of the basswood and soaking the inner bark, weighted down with stones, at the edge of a lake for 15 days, "without looking at it, or it won't separate." Now by working it between the hands the layers separate easily. Twine is made by pulling off two dry strands about one-fourth of an inch wide and rolling them on the shin with two motions. The first roll is toward the worker, and the second, more brief, is away from her. *Wi'gõõb* is added to overlap a strand running out. It makes a strong and very satisfactory weft.

One other material required was cord for the first row. Formerly nettle fiber cord (*ũ sé ũ sũb*) was used because of its strength. Since this was out of season, 20-pound test green fishline was used. Smith alone (1932, p. 418) mentions that "the edge is bound securely with nettle fiber cord." Others name basswood twine for the first row (Kinietz and Jones, 1942, pp. 525, 531; Densmore, 1929, p. 155). With one exception, all find basswood twine for the weft: Densmore (*ibid.*; 1928, p. 378), Hilger (1935, p. 41; 1951, pp. 135, 137—all "warp"), Gilmore (1933, p. 124—"warp"), Volney Jones (1937, pp. 6, 12), Lyford (1953, pp. 89-90), Kinietz and Jones (1942, pp. 525-526). Kinietz and Jones add, "At present, commercially manufactured cord is often used. Through a part of one mat . . . alternate pairs of weft strands are of basswood cord and cotton fishline."

In contrast to Mrs. Wadena's 62½ hours to make the twine, Volney Jones' informant (1937, p. 6), together with her sister, made it in 1 day. A full and informative discussion of basswood twine may be found in this work by Jones.

FIRST ROW

For making the first row (*ni bi da'so*) or upper selvedge, Mrs. Wadena dispensed with the white man's furniture and sat on a cushion on a blanket spread on the ground. She used 12 of the 14 prepared bundles (pl. 46, *b*), discarding a few rushes she judged too large. Two lengths of fishline cord are prepared, each four armspreads long. (An armspread is approximately 5 feet.) They are placed parallel and are hereinafter treated as one cord of double thickness. At the center of the cord is tied a knot with a small projecting loop, which is in the worker's left hand and points toward the left. Except for about a yard on either side of the knot, each of the two ends of cord is rolled

into a little ball and fastened to prevent tangling. The balls rest on the ground at the right of the worker. Farther to the right are two untied bundles of rushes, one with the large end toward the worker and one with the small.

The basic process continuously repeated for the first row is this (fig. 28):

1. Holding the knot end of the cords in the fingers of her left hand, the worker twists the two cords together for one-half turn toward herself (counterclockwise) and holds the uppermost cord in her teeth for tension.

2. With her right hand she grasps the 4-inch end of the uppermost of the two rushes last added, bends the end to the right and away from herself so that it lies between the two cords, and holds it with her left thumb and index finger.

3. With her right hand she grasps the 4-inch end that is farthest away from the end just bent down, and bends it down next to this one, on the way passing it under the first 4-inch end that it passes by, and over the next 4-inch end.

4. Holding both ends with her left hand, she trims them with scissors to one-half of an inch in length, at a somewhat oblique angle.

5. Fanning the ends out she conceals them with two rushes, one laid over them and one under them, but both lying between the two lengths of cord. Four inches of the rush extends beyond the cord and points toward the worker. The remainder rests on the ground, pointing away from her. She uses the thick end of one rush and the thin end of the other, reversing the order the next time rushes are added.

She repeats the twisting of the cords and the other four steps until the length of the mat is reached. Only the beginning necessarily varies from this procedure, because there are no previously added rushes. The beginning is thus (fig. 29):

1. She picks up four rushes in the right hand, two by their thick ends and two by their thin ends, lays them at the V formed by the knot in the center of the cord, with 4 inches extending beyond the cord as described in step 5 above, and twists the cords as described in 1 above.

2. She bends as described in 2 the rush nearest the twist.

3. She bends as described in 3 the rush farthest from the twist and nearest the knot.

4. She trims, and adds two rushes as in 4 and 5.

5. She twists cords.

6. She bends the uppermost rush just added.

7. She bends the second rush from the knot, passing it under and over the other ends of the way.

Thereafter she twists the cords and continues the basic process (pl. 47, c).

Mrs. Wadena interspersed the plain rushes with series of dyed ones, not counting or measuring for the intervals except with her dim eye. She had estimated the number of colored ones needed before dyeing took place. She used 34 plain, 7 dyed; 43, 6; 38, 7; 74, 5; 48, 6; 44—a total of 312 making 61 inches. Working time was 3 hours.

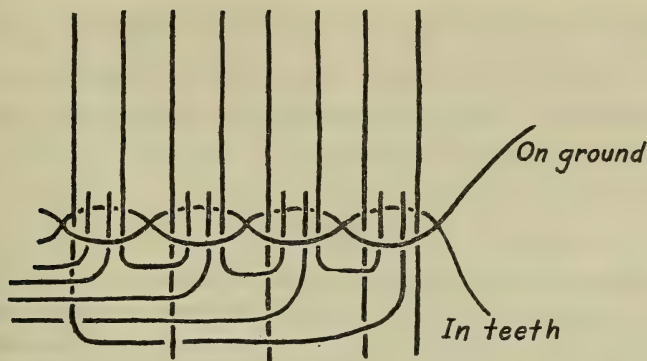


FIGURE 28.—Rush mat selvedge: Basic process.

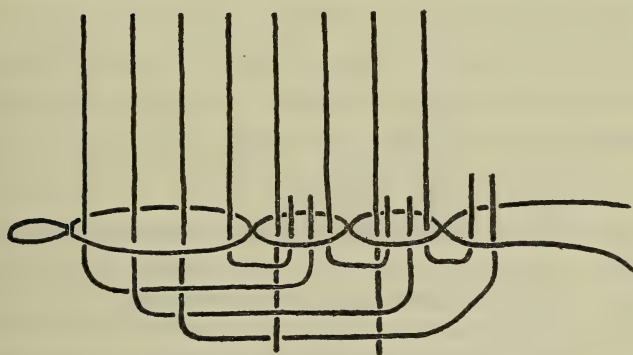


FIGURE 29.—Rush mat selvedge: Beginning.

If a thinner mat is desired, a “3 braid” edging could be used instead of the “4 braid” here described. A thicker mat can be secured by doubling the number of rushes added at a time, using two below and two above the bent-over ends. This mat would wear better.

The literature provides few accounts of the making of the first row. Densmore’s one-sentence explanation and the accompanying detail photograph (1929, p. 155; pl. 60, *a*) give no clue on how to go about beginning a mat. Neither does the following picture of a worker who is making the first row, nor Lyford’s illustration of the same subject (1953, pl. 48, *b*). Only Kinietz and Jones’ admirable study of the making of a mat provides a lucid description of the technique (1942, pp. 531–533; fig. 2; pl. 3, fig. 1), which resembles that of the present study to a marked degree.² Their process adds

² Herbert H. Shippen’s “A Woven Bulrush Mat from an Indian Tribe of the Great Lakes Region” (Michigan Acad. Sci., Arts and Letters Pap., vol. 39, 1954) also contains useful data, sketches, and photographs. It is not cited in this paper because from the design the mat appears to be Sauk and Fox (cf. Smith, 1925 a).

four at a time instead of two, as Mrs. Wadena suggested as an alternative. The only notable difference lies in the fact that their edging omits the weaving or braiding of the 4-inch ends that is both beautiful and durable. They also mention that the ends are "tucked in" between the newly added rushes, rather than that the ends are first bent over and the rushes then added.

WEAVING

The first row is now lashed to a pole, which in the present instance was 101 inches long and $1\frac{1}{2}$ inches in diameter. With a knife the pole may be notched slightly on two sides on the same circumference, to keep the lashing from slipping. The material used is $\frac{1}{4}$ -inch strips of *wi'gōōb*, not twisted to twine or even soaked in the lake. It may be prepared simply by stripping off the basswood bark and removing therefrom the outer bark. The worker sits on the ground with one end of the mat and pole in her lap and the rest of the pole extending under her left arm and back to the left. Starting at the end at which work ceased (left end of mat) but leaving 1 inch free at each end, she lashes the row to the pole at $1\frac{1}{2}$ -inch intervals in such a way that the row is in front of, not below, the pole.

It is nailed to two trees at the eye level of the weaver and is raised during the weaving whenever the work becomes inconveniently low (pl. 48, *a*). Stakes are driven into the ground at the lower corners of the warp, slanting so that the upper ends are $1\frac{1}{2}$ feet from the upper corners of the mat. The upper ends of the stakes are secured by nailing to the tree or tying to the pole. Tension on the mat is obtained by tying to each of these stakes at a point one third of the way from the top a strand of *wi'gōōb* twine twice the width of the mat in length and doubled in the middle, where it is attached to the end of the green cord of the first row. These pieces of *wi'gōōb* twine form the side selvages. To the left one are attached the weft strands, two of which are made by doubling in the middle a piece of *wi'gōōb* twine twice the length of the mat and looping it around the left selvedge. Six double weft strands are fastened to begin with, and others are added as work progresses. The free ends are looped around the upper end of the nearby stake with a slipknot until needed. This preparation for weaving took an hour.

The several accounts report the same procedure in lashing the first row to the pole (Densmore, 1929, p. 155; Kinietz and Jones, 1942, p. 533, fig. 1). However, there are several possibilities in structures for weaving. A light and portable three-sided frame such as was used for the cedar-bark mat of the present study is recorded (Kinietz

and Jones, 1942, pp. 529-530, fig. 1; Densmore, 1918, p. 98, fig. 100; 1928, pl. 48, *a*; 1929, p. 155, pl. 61, *a*; Lyford, 1953, p. 89; pls. 48, *a*, 49—after Densmore's pl. 61, *a*). Lyford also reports "a temporary shelter of leaves or other shade," and Kinietz and Jones agree (1942, p. 530). Densmore (1929, pp. 155-156, pls. 62, *a*, *b*; 1928, p. 379, pl. 48, *c*) details the construction of a pine bark weaving house containing a heavy permanent frame for mats. She mentions the alternative of a dark shed for storing supplies "of birch bark, rushes, and strips of basswood bark." In just such a structure these same materials were stored by Mrs. Sam in the present study.

A refinement of the crude frame is described and sketched by Boyle (1898, p. 26, fig. 32). He notes "an upright pole at each side, one end of which was fitted into a hole at the extremity of the cross-bar." It leaned against the house, "the upper bar being supported by the wall." An ingenious device is shown by Kinietz and Jones (1942, p. 534; pl. 2, figs. 1, 2—the latter picture also found in Kinietz, 1947, pl. 31). It adjusts the height of the work "by providing arrangements to lower the crosspiece down the back of the supports and by having another top crosspiece over which the mat may hang." What appears to be the same apparatus is pictured by Densmore and described as a permanent support against which to lean the portable frame (1929, p. 155; pl. 1, *b*).

Kinietz and Jones (1942, p. 533, fig. 1) give essentially the same method for forming the side selvedge and attaching the weft strands as does the present study. Densmore says only (1929, p. 156), "The ends of the mat were tied to the upright posts."

Weaving is begun with the uppermost single weft strand, and moves from left to right. The weaving process consists simply of the weft strand's passing over one warp rush and under the next. To speed the process the fingers of the right hand raise the rushes on the front of the mat to separate them from those on the back, which are grasped between the left thumb and fingers, the thumb being toward the worker. When the left hand can conveniently hold no more (about seven rushes), the right hand pulls between the two layers the weft strand, which is then grasped by the weaver's teeth for tension. The process is repeated until the row is finished and the end of the twine secured to the selvedge strand by a double knot.

With the second half of the doubled twine the process is repeated except that this time the rushes from the back are raised. The two rows are repeated until the lower end is approached. The ends are then trimmed off evenly. Weaving ends 4 inches from the bottom, and the mat is removed from the frame for completion. A row like

the first is used as a finish (pl. 49), ending at the lower right corner, where the meeting strands are knotted together. Ends of weft twine are now trimmed to a 1-inch fringe.

Several procedures are followed during the weaving. Whenever the pole is raised, the side selvages must be retied.

To keep the weft from sagging, several wedges must be used in each row. They are formed by tucking up a warp rush behind which the weft strand has just passed. The left index finger pushes a loop of the rush up behind the strand. The loop is pulled down as the next row of weaving reaches it.

Work must be watched closely to keep it straight, not only horizontally but along the vertical edges, where too hard a pull on the weft may cause a bowing in of the edge. Several women may work on the mat at once, to speed the process. When one weaver is halfway across, a second may start the next weft strip, and when there is room for her a third may join. This is the maximum number of workers for a mat of this size. Men did not assist anywhere in the process except in gathering and processing materials, perhaps because they were engaged elsewhere on the day of the weaving proper.

Rushes must be kept damp. If they are thoroughly damp to begin with, occasionally splashing water on the part being woven will be sufficient. When they become dry throughout, work must cease pending wetting by rain or night dew. For this reason it is best to begin at daybreak. A dry mat will bulge and be difficult to weave straight. The mat in the present study shows the effect of weaving the center portion when the rushes had dried out (pl. 48, *b*).

When a rush breaks, a new one is added and carried along with the stub of the old for about 1½ inches. Protruding ends are later clipped off. Mistakes are rectified by ripping back individual rushes as needed. If an error is too difficult for correction to be practical, offending rushes are snipped off.

Weaving proper took 21 man-hours, and edgings 3 hours apiece. Total man-hours consumed in the manufacture of the 40½- by 58½-inch mat were 121.

Mats do not differ greatly in width because this dimension must conform to the length of the rushes. The size of finished mats is variously said to be "from 36 to 45 inches wide and from 2 to 3 yards long" (Lyford, 1953, p. 89); "3 feet wide and from 4 to 8 feet long" (Smith, 1932, p. 418); "26 to 42 inches in width . . . 49 to 87 inches" in length (Kinietz and Jones, 1942, p. 536). Using Indian measurements,

an informant measured the width of a bulrush mat with seven hand stretches (from tip of thumb to tip of long finger). . . . The length of a mat was a

double arm stretch and a half (one-half was distance from tip of hand to shoulder). When a mat was completed, it was stretched, the give of the weave lengthening it to two double-arm stretches. [Hilger, 1951, p. 104.]

The same "over-under" weave is mentioned by Boyle (1898, p. 26, fig. 32—detail), Densmore (1928, p. 378), and Kinietz and Jones (1942, p. 533), the latter concurring in essential details of weaving proper. Lyford's claim for twining in rush mats was discussed earlier under "Technique." Densmore notes (1929, p. 155) that the weft cord was "held in a little roll in the weaver's left hand." On the following page she characterizes the lower edge as being finished "in a manner somewhat similar" to that of the upper, while Kinietz and Jones (1942, p. 534) find it identical with the first row. Their worker took down the mat to do the last row, ended at the right-hand corner, and, in place of a fringe, finished the right-hand edge by binding the weft cords over the ends of the preceding ones as work progressed. Side borders were kept straight by the tension of cords running from the mat to the uprights. Splicing of broken rushes was done as noted above. Variations in closeness of weave resulted from the spacing of the weft strands on the side selvages, the amount of upward pull on weft cords, and the maintaining of moistness (*ibid.*, pp. 533, 534).

For moistness many devices are used. Kohl records (1860, p. 10) :

The Indians told me they did not plait these mats in dry and cheerful weather, but on damp and rainy days, else the reeds would become brittle. I lived once in the house of a very industrious mat-plaiter; every night she laid her work out in the dew. The next morning she brought it in, and plaited a bit more, till the sun rose too high. I asked her why she did not pour water on it during the day, but she said that would turn the reeds black.

Contrary to this mat plaiter, Kinietz and Jones find (1942, p. 534), "Water may be applied by pouring from a vessel, sprinkling with the hand, or blowing from the mouth." Hilger's informants also used the last-named practice (1935, p. 41; 1951, p. 136) and utilized the dew (Hilger, 1951, p. 136). Says one, "I rose very early one morning, while the rushes were yet damp with dew, to make a bulrush mat. It was still dark" (*ibid.*, p. 72).

Rushes for the first row are dampened, according to Kinietz and Jones (1942, p. 532),

by pouring water over them or by wrapping them in a moist blanket or quilt and leaving them there overnight. Water may be poured on them at intervals; hot water hastens the process. The worker generally does the border in a cool, shady place. . . . The cord may also be dipped into the water to soften it.

The weaving house, storage shed, and shelters described earlier were built to protect the rushes from drying, as well as for the comfort or convenience of the weaver. Without them,

she could work only in the early morning or late evening when the condition of the atmosphere was such as to moisten the rushes. Her work was a constant care to her as the rushes must not "dry out" before the mat was completed. [Densmore 1929, p. 155.]

"Occasionally on a rainy day," says Lyford (1953, p. 90) "several women would work together on a mat, completing it in a short time." She also mentions (*ibid.*, p. 88) that "the gathering of bulrushes . . . was one of the activities of special interest to the women." Densmore notes (1929, p. 123), "The girls carried them to the camp." Hilger (1951, p. 136) and Kinitz and Jones (1942, p. 536) find the entire process to be woman's work, and the latter say it was particularly for older women. They add that two or three may weave, as well as co-operate in the entire work. If men help, it is with the construction of the frame.

Several factors rendered the mat in the present study somewhat inferior in workmanship. Because of her handicap Mrs. Wadena had to surrender the weaving proper to younger women with little or no experience, and to simplify the pattern used. The mat was uneven not only in weft and margins, but in diameter of warp strands. The weaver preferred larger rushes for the sake of speed. Such a rush tapers considerably to the small end. If small rushes had been selected, they would be more uniform throughout their length. In addition, they are firmer and do not bulge on either side of the tight weft strands. Rushes averaged 5 to the inch, while in other older mats they may average 8, or, in one of remarkably fine texture made by Mrs. Goodsky, the cedar-bark weaver, 11 to the inch.

The only pattern consisted of bands of color, unevenly distributed. This is the simplest of the mat patterns, which range in complexity up to what must have been one of the most difficult, recalled by a Red Lake informant—the figure of a horse. Only a skilled weaver would be able to make "a mat with flowers effectively spaced" or "a vine with leaves crossing the mat at intervals" reported seen by Densmore (1929, pp. 155, 156). She goes on, "This was very difficult to make, as the rushes are likely to be broken on a curved pattern. In old times the pattern often covered the entire mat, the center having a design of its own and a border being placed around its edge." A mat in the writer's possession, from White Earth Reservation, shows a cluster of leaves (?) at each end (pl. 57, b).

Ornamentation and design may be introduced into rush mats by coloring some of the rushes, by varying the technique of the weave, or by a combination of these two methods. Dyed rushes may occur in plain stripes, with no variation in the weaving—a very common practice—and several colors may appear in a single mat, the colors being alternated in spaced bands. Ordinarily only a relatively small percentage of the rushes in a mat are dyed. Design by weave

variation is achieved by crossing the rushes over each other between the weft strands, which gives a zigzag appearance [see pls. 57, *a*; 59]. . . . By this device rushes may be inclined diagonally across the mat for some distance, with more or less abruptness. Another method of modifying design is by twisting adjacent rushes about each other, so that a raised effect results. The rushes may be manipulated in pairs or in groups of four. Variations in weave are sometimes carried throughout the entire mat, but are usually confined to areas of dyed rushes. The combination of color and weave variation may result in elaborate and intricate geometric patterns. [Kinietz and Jones, 1942, p. 535.]

"A diagonal plaid was woven by carrying one-half the rushes diagonally to the left, the other half to the right," says Lyford (1953, p. 90).

Rush mats do not photograph well, so that their patterns cannot be positively identified from illustrations. The following appear to be the designs used in pictured mats: bands of geometrical designs (Boyle, 1898, fig. 32); bands and zigzag lines (Coleman, 1947, pl. 8, *b*; the mat in pl. 8, *a*, is not of rushes); no pattern (Densmore, 1918, fig. 100); bands (*ibid.*, 1928, pl. 48, *a*); diamonds joined by lines (*ibid.*, 1929, pl. 1, *b*); intricate framed geometric design and bands (*ibid.*, pl. 63); no pattern (*ibid.*, pl. 61, *a*; also reproduced in Lyford, 1953, pl. 49); bands of latticework (*ibid.*, pl. 48, *a*); bands of geometric designs (*ibid.*, pl. 48, *b*); bands and geometric blocks (Kinietz and Jones, 1942, pl. 3, fig. 2); zigzag bands (*ibid.*, pl. 2; also reproduced in Kinietz, 1947, pl. 31).

A page of design elements copied from mats (Lyford, 1953, pl. 78) shows diagonal lines, zigzags, latticework, a design made up of geometric figures, and an intricate design of angles.

Occasionally one still sees rush mats [in 1938]. . . . The colored pattern of diamonds made by using colored rushes is seldom seen, however. Generally no artistic design is used, borders of colored reeds making them attractive. [Hilger, 1939, p. 158.]

Though they are little used today [1953], the rush mats are still made with straight line and diagonal designs worked out in colored rushes. Occasionally they are offered for sale. Old ones are to be found in many of the homes where they are valued as keepsakes from mothers and grandmothers. [Lyford, 1953, p. 90.]

USE OF MATS

At Mille Lacs the rush mat is still occasionally seen on the floor of a summer tent, or beneath the sacred water-drum in the Mide ceremony. In 1938 on White Earth Reservation, "eight of the seventy-one families living in tar-paper shacks possessed bulrush mats. Some were merely keepsakes . . . while others were used for squatting purposes in berry patches or while out gathering wild rice, moisture penetrating them less easily than rag rugs." In earlier times, "they squatted on rush mats . . . when at work or when eating, and

lounded on them while at leisure" (Hilger, 1939, pp. 146, 166). Their use for lining the walls of the wigwam is noted by Willoughby (1905, p. 89) and Gilmore (1933, p. 124). A hundred years ago Eastman Johnson, a visitor to Grand Portage, Minn., painted the only known pictorial record of a Chippewa rush mat used in this way (pl. 58). At about the same time two travelers were attracted by them and recorded:

The interior of their [Mide] lodge or sanctuary was hung round with mats constructed with rushes, to which were attached various offerings consisting principally of bits of red and blue cloth, calico, &c., strings of beads, scalps of enemies. [Kane, 1859, p. 71.]

These mats, with which the Ojibbeways cover the walls of their wigwams, and which also serve as carpets, beds, and sofas, are the handiwork of the women, and are excellently made, . . . very soft and lasting mats. [Kohl, 1860, p. 10.]

PREDOMINANCE OF RUSH OVER CEDAR-BARK MATS

Rush mats are often bracketed with cedar-bark as being used interchangeably. "Both types of mats, when new, served largely as tables, being spread out on the ground with food and dishes resting on them. They were rolled and stored near the wall of the wigwam when not in use. Worn mats were used as rugs, the family squatting or resting on them" (Hilger, 1939, p. 166). The only difference in use appears to rest on Densmore's citation (1929, p. 27) of "cedar mats" for the lower part of the exterior walls of a peaked lodge in Canada. However, because of the weave of cedar-bark mats, they would be impractical for such use, and mats in the sense of sheets of bark were probably intended.

Yet rush mats must have been far more commonly made than cedar-bark, for in illustrations they outnumber cedar-bark by three to one. Although cedars grew throughout the rush-mat region, Densmore's observation (1929, p. 156) bears out the lesser role of cedar bark: "In northern Minnesota and Canada, where rushes were not abundant, the floor mats were made of strips of cedar." The reason for the predominance of rush mats is an interesting question.

According to informants, although both rush and cedar-bark mats are durable, the latter are more resistant to dampness. Volney Jones (1948, pp. 360, 345) mentions this quality and the resins in cedar bark. Both mats appear about equally portable, being compact, light in weight, and pliable. The warm months are the season for gathering materials and for weaving in each case. Both kinds of mats provide opportunity for creative expression.

A time study of the manufacture of these mats throws little light on the question. The time used for the cedar-bark mat in the present

study, in which commercial cord was used, was 33 hours; for that in Volney Jones' paper, in which the worker made her own twine, was 20 hours (1948, p. 354). Mrs. Wadena's bulrush mat needed an astonishing 121 hours of time.

For many years commercial dye and cord have been widely used for mats. If we exclude the time consumed in making these two items, the cedar-bark mats require 29 and 17 hours respectively; the bulrush, 46. Even allowing for the diversities in time used brought about by personal factors such as experience, nimbleness of finger, speed, good eyesight, high standards of craftsmanship or their lack, rush mats appear to be much more time consuming.

A clue to the reason for the predominance of bulrush mats lies in a fact noted by other writers as well as this one—the occasional survival today of a few keepsake rush mats. In contrast, the preservation of any cedar-bark mats in the field has not been recorded. Mrs. Goodsky warned that the cedar bark would crack if flattened while rolled. Rush may be rolled, folded, or crushed into a compact bundle without adverse effects. It seems likely that rush mats were preferred because they were better adapted to survive the rigors of a seminomadic existence.

CATTAIL MAT (RECTANGULAR)

TECHNIQUE: PIERCED WARP WITH TWO ROWS OF PLAIN PLAITING

Pierced warp is defined as "the form of weaving in cat-tail and other soft material when the weft strings pass through the warp. The warp stems are strung on the weft strings" (Mason, 1904, p. 195).

"Plain plaiting is made by passing the elements over one and under one" (Lyford, 1953, p. 62). (See fig. 20.)

BACKGROUND

As with the previous mat, only Mrs. Maggie Wadena possessed the knowledge, experience, and physical condition required for making a cattail mat, as far as considerable investigation throughout northern Minnesota could determine. Small wonder that she was a repository of Chippewa craft lore; she came of stock noted for skill in craftwork. Her parents, Mr. and Mrs. Tom Skinaway, had been valued informants to Miss Frances Densmore in the early part of the century.

At the time of the present study she had a temporary lodging to the northeast of Mille Lacs Lake, where she had just completed harvesting and processing wild rice. Since all of her children were deceased, she had joined forces for the strenuous ricing season with the Ole Sams, the younger couple who were mentioned previously as her helpers for the rush mat.

Mrs. Sam interpreted and gave the assistance necessitated by Mrs. Wadena's failing eyesight. Mr. Sam procured the cattail leaves and supplied information gathered while watching his mother make cattail mats in earlier days. Mrs. Wadena, too, had learned the art from her mother, but had not made a mat for 10 years.

Except for one informant who formerly lived at Whipholt, 60 miles northwest of Mille Lacs, only in the Mille Lacs area do residents still retain a recollection of the use of these mats. Writers mention Mille Lacs for them more frequently than any other locale (Brower, 1900, pls. 28, 34; Bushnell, 1919 a, pl. 2, *b*; 1919 b, p. 614, pl. 3; 1922, p. 14; Densmore, 1929, pp. 119-120; Hilger, 1951, pp. 137, 139). Others find them all across northern Minnesota, from its western extremity on the Red River south of Pembina (Henry, 1897, p. 133) to Lake of the Woods (Snelling, 1936, p. 69), White Earth Reservation (Hilger, 1951, p. 140; Beaulieu in Clark, 1885, p. 376), the upper Mississippi (James in Tanner, 1830, p. 55), Leech Lake Reservation (Bushnell, 1922, pl. 6, *b*), and Nett Lake Reservation (Reagan, 1924, p. 117; 1928, p. 245). They continue across northern Wisconsin from Danbury on the St. Croix River (Thayer, 1940, p. 97) to two at Lac Courte Oreilles and three at Lac du Flambeau Reservations (Hilger, 1939, p. 45; 1951, pls. 26, *1*, and 27, *3*; and Smith, 1925 b, fig. 21; 1932 p. 340). At Lake Huron, Gilmore (1933, p. 124) and Radin (1928, p. 663—near Sarnia) note them to the south and southwest; and Jenness (1935, p. 113—at Parry Island) and Kane (1859, No. 1; Bushnell, 1922, pl. 7, *a*—after Kane, 1859; Bushnell, 1940, p. 4, fig. 1—on the Spider Islands), to the northeast. Kane (Kidd, 1946, p. 5) sees them to the northwest at Sault Sainte Marie, while Peter Jones (1861, p. 72) records "nets, made of flags" southeast of the lake. Willoughby (1905, pp. 85, 89) and Holmes (1896, p. 19) find a similarity of these mats to those encountered on the East coast by early European visitors.

GATHERING MATERIALS

Ole Sam asserted that the time to gather cattails (*ũ pũk wesh' kwe ũk*) is "after ricing" (late September or early October) or "when they lose their green color." Other informants said "only when the leaves fall; the cattails are not strong enough earlier."

Some writers give the season for gathering and some for weaving the cattails. Assuming that both processes take place within a few days of each other, we find a wide range for the proper season, although the instances are all in Minnesota. Densmore's Mille Lacs informant (1929, p. 119) concurs in the after-ricing date. Henry (1897, p. 133) specifies November 1, 1800. Hilger (1951, p. 139) says fall; Reagan (1924, p. 117) and Lyford (1953, p. 90), when full grown

in summer; and Winchell (1911, pp. 586-587), midsummer. As maximum size is desirable, it would be logical to wait to gather them until growth ceases, after frost. This date varies with location and season, but usually occurs in October or late September.

While driving in the vicinity of his house, Mr. Sam noticed that the tallest growth of cattails, about 5½ feet, was in a swamp near a creek.³ Here he and a friend cut in 2 hours enough for the mat in this study. They selected plants with wide leaves and rejected fruiting stalks because of their short leaves. After cutting them close to the ground with a sharp knife they delivered them to the women who set to work preparing them at once before they dried out.

The writer's finding of the botanical name of this plant as *Typha latifolia* L. is confirmed by Densmore (1928, pp. 294, 295, 378), Gilmore (1933, p. 124), Lyford (1953, p. 88), Reagan (1928, p. 245), Smith (1932, p. 423), and Tanner (1830, p. 55). Two writers say that gathering cattails was the particular duty of the women (Lyford, 1953, p. 88; Winchell, 1911, p. 587); and Hilger says the women "pulled" the cattails (1951, p. 138). This term is probably an error, and may arise from her use of "bulrush" as the name for both cattail and rush. (For definitions of the two, see p. 234.)

PREPARING MATERIALS

The leaves of the plant (pl. 46, *b*) are divided with the fingers into two parts between which a knife is inserted to separate them at the lower end where they are joined. After the short outer leaves are discarded two long outside leaves and three to five inside leaves remain. Outside and inside leaves are tied in separate bundles 3 to 5 inches in diameter by means of strips of basswood fiber. The lower ends of the leaves are placed together evenly and the excess over 55 inches is cut off the upper ends by laying the bundle on the ground and cutting it with a knife (pl. 46, *b*). Mrs. Wadena determined the length by holding a leaf in one hand and sliding the other along it until the fingers reached what she thought was the right length. Her poor vision may account for this procedure. She prepared four bundles of outside leaves and five of inside for the mat in this study, and she leaned them against the house to dry in the sun. They dry in 5 days in clear weather and must be taken in if it rains. It took the two women about 2½ hours to prepare the bundles.

Radin (1928, p. 663), too, mentions drying them. Densmore's informant (1929, p. 119) cites another method of drying: "She selected a nice smooth piece of ground and spread them out."

³ When he gathered them there a year later they broke so easily as to be useless. He believed the condition might be due to the dry summer.

An additional material needed is cord (*o kwe ga ne' ab*) to be used in three ways. Mrs. Wadena formerly used *wi'gōōb* (basswood-bark fiber) twine for a foundation and for sewing, and the stronger nettle fiber cord (*ũ sé ũ sũb*) for tying the first row. Reagan (1924, p. 117) says mats were "strengthened at the edges by being counter wrapped with basswood twine." Jenness (1935, p. 113) ambiguously mentions that they were "stitched together at top and bottom with thread from boiled basswood root [bark] that had been scraped while soft and then twisted on the leg." Densmore (1929, pp. 119, 157) finds "boiled basswood bark" cord for the foundation, and "strands of basswood fiber which had been boiled to make it tough" for sewing. Gilmore (1933, p. 124) notes that stitching was done "with twisted thread of basswood fiber, or with the fiber of *Apocynum cannabinum* [Indian hemp] or of *Asclepias incarnata* [swamp milkweed]." Henry (1897, p. 133) tells of "threads of the inside bark of bois blanc [basswood] of the thickness of sturgeon twine" for sewing; and Smith (1932, pp. 340, 423), "nettle string" and "basswood fiber."

Details of the manufacture of twine from natural fibers may be found in Volney Jones' thorough study (1937) and further details in Densmore (1928, p. 378; 1929, pp. 152-154), Hilger (1951, p. 125), and Lyford (1953, pp. 44-46).

For the present study Mrs. Wadena used two kinds of commercial cord: for the foundation of the first row, two strands of raveled burlap bags twisted together; for tying the first row and for sewing, soft rayon knitting and crocheting yarn of the diameter of fourfold knitting worsted, which she always used doubled.

Other equipment needed includes scissors for cutting the cord, six 8½-inch pegs whittled out of branches five-eighths of an inch in diameter, two side sticks, and two needles. The side sticks (*sa ga kwe' gũn ũn*) are as long as the bundles of cattails, one-fourth of an inch thick, and about five-eighths of an inch wide. They are whittled from freshly cut white ash wood, are rounded on the edges, and have a hole burned with a hot wire 1 inch from one end of each.

One of the men made the pegs, side sticks, and wooden needles. The needles (*na mũng'*, pronounced with a hard g) are three-eighths of an inch wide, one-eighth of an inch thick, and nearly 11 inches long, with one end tapered like a slightly blunted dagger point, and an eye burned somewhat farther from this end than from the other (pl. 46, b). In earlier times Mrs. Wadena used needles made from deer ribs flattened by removing the rounded surfaces with a knife (pl. 46, b). They were similar in dimensions to the wooden ones but somewhat wider. They were also sharply pointed and slightly bowed,

facilitating the sewing of cattails. Another informant told of seeing needles (*okan ĭ sha' bo nĭ gŭn*) made of steel by a blacksmith.

Smith (1932, pp. 340, 423) and Densmore (1929, p. 119) mention bone needles. The latter adds (pp. 157, 169; pl. 9, *a(g)*), "The needle was slightly curved and was usually about 9 inches long. In a majority of instances the 'eye' was near one end, but a very old needle was obtained in which the eye was midway the length. This needle was very long." "The ribs of rather small animals were used in making the needles." Thayer (1935, pp. 3, 4) pictures both bone and steel needles. Elsewhere (1940, p. 97) he pictures and describes a bone needle "made of split rib" and "polished."

Needles are furnished in pairs so that two workers can sew at the same time, one at each end, when a full-length mat is made.

FIRST ROW

Mrs. Wadena said that for a wigwam four mats were required, each "2 arm-spreads long" (10 to 12 feet). For the present study she made a mat (*ŭ pŭk' we*) 4 feet 2½ inches long at the selvage by 4 feet 5½ inches wide and indicated that it should be 3 inches wider.

The size and number of mats were determined by the size of the lodge and the proportion of its surface which the cattail mats covered (pl. 52, *b*). Sometimes a double tier was used on sidewalls (Jenks, 1900, pl. LXIX; Lyford, 1953, pl. 50), surmounted by a proportionately smaller area of roofing bark. Bushnell (1922, pl. 8, *a*) pictures a tipi with a lower tier of birchbark and an upper of bark and cattail matting. Gilmore (1933, p. 124) and Lyford (1953, pp. 17, 91) cite mats for roofing wigwams, Lyford adding, "Sheets of . . . bark were laid over the upper mats to provide a waterproof roof." "Six mats were needed to cover the sides of a good sized dwelling. Twelve mats might be needed when a lodge was to be entirely covered by them." It is likely that beneath the more waterproof bark roofing, cattail mats were frequently used for additional warmth. Here they could pass undetected by a writer or his camera.

Other tribes of the western Great Lakes, however, regularly used them for top roofing. They are pictured used this way by Smith for the Meskwaki or Sauk and Fox (1925 *a*, fig. 15; 1928, pl. XXXVII, 4); Skinner for the Mascoutens or Prairie Potawatomi (1926, pl. ix, 2); and Radin (1923, pl. 18, *a*, *b*; pl. 19, *c*), Bushnell (1922, pls. 36-37), and Seth Eastman (Schoolcraft, 1853, vol. 2, pl. 23) for the Winnebago. Such use by the Menomini is cited by Smith (1923, p. 74), Skinner (1921, p. 246), and presumably by Hoffman (1896, p. 258).

"My mother knew just how long they should be to go around the wigwam," Densmore's informant (1929, p. 120) relates, "and we made five long ones, four of middle size, and two small ones. The long ones were two double-arms' lengths, and the middle-sized ones were about one and a half double-arms' lengths." Henry (1897, p. 133) says, "They are made from 12 to 18 feet long, and 5 or 6 wide." Hilger (1951, p. 139) cites mats 49 and 50 inches in width; Reagan (1924, p. 117), "from 3 to 5 feet in width and from 10 to 20 feet in length," a figure which he later amends (1928, p. 242) to "20 to 25 feet in length"; and Willoughby (1905, p. 89), "4 to 5 feet in width and about 10 feet in length."

The first step in making the mat is to fashion what will be the upper edge when the mat is in use. This is done by tying the cattail leaf warp strands onto the foundation twine by means of a tying cord. The foundation twine is cut about 8 feet longer than the desired length of the mat and hung by a slipknot from a hook in the ceiling in such a way that one end just reaches the floor. Before this the worker seats herself on the floor and knots the end of the doubled tying cord to a point about a foot from the lower end of the foundation twine. Hanging the twine provides the necessary tension while the tying cord is pulled tight. Smith (1925 a, fig. 18) pictures a Meskwaki (Sauk and Fox) woman obtaining tension by fastening the twine to a point above her on the wall.

It will be recalled that in bundling the cattails, the outside leaves were separated from the inside leaves. The former are to stand upright in their natural positions when the mat is in use, while the latter are to be inverted. The greater width, thickness, and curvature of the outside leaves at their lower ends suggest several reasons for using them in their natural positions: they provide a strong footing for the mat in use, they widen the lower edge of the mat so that it will better fit the lodge frame, and they would be difficult to tie into the upper edge.

Hence, for making this edge the lower ends of the inside leaves and the upper ends of the outside leaves are used. In order to soften them the bundle end to be used is rested in a basin, and boiling water is poured over it while the bundle is rotated. Two bundles each of outside and inside leaves are treated first, and others when needed. The treated bundles are opened and laid to the left of the worker with the ball of doubled tying cord to her right. Because of Mrs. Wadena's poor vision and to speed the work, her assistant selected long and wide leaves and handed her each pair. A leafy upper treated end is always laid inside a concave lower treated end. When they are folded the leafy upper end is invisible.

To tie the first pair of leaves for the upper edge:

1. The worker grasps a pair of leaves, concave side toward her, with the thumb and index finger of the left hand about 2 inches from the end, which is in front of her and near the hanging foundation twine.
2. With her right hand she loops the tying cord loosely around the leaves and the two fingers holding them, winding in the direction away from herself and keeping the loop open with the two fingers (fig. 30, *a*).
3. She places the leaves behind the foundation twine with about 1½ inches projecting on the right side of the twine.
4. She turns the ends of the leaves over the foundation twine, toward her.
5. She slips the ends under the loop, her left fingers assisting.
6. She pulls downward hard on the side of the loop away from her, to pull the ends of the leaves closely together (fig. 30, *b*), and ties the end of the cord in a slipknot. (This knot is not repeated in the rest of the process.)
7. She pulls the excess tying cord to the front.

To tie the second pair of leaves the same process is used except for a reversing of certain directions as noted:

1. The concave side is away from her.
3. She places the leaves in front of the twine.
4. She turns the ends away from her.

These two processes are repeated alternately until the desired length is reached. They produce two layers of cattail leaf warp strands, each layer consisting of a durable and fairly smooth exterior shell and a tender and more irregular lining. The foundation twine is lowered occasionally as the work proceeds. It is now unhooked and the side sticks are added. Before the sticks were added in this study, the work was moved outdoors in order to photograph the tying of the first row (pl. 50, *a*).

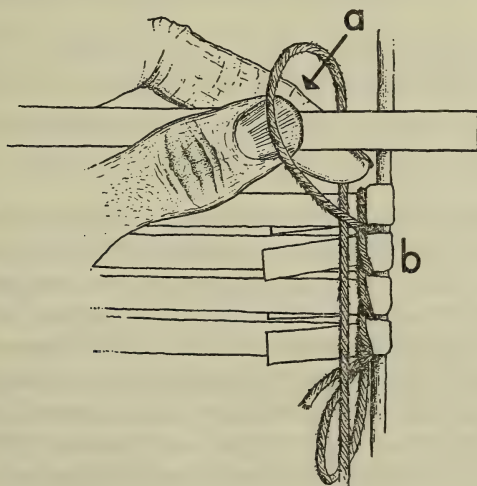


FIGURE 30.—Cattail mat technique: Loop made for selvedge.

These sticks are mentioned in the literature only by Willoughby (1905, p. 89) but they must by necessity have been universally used. They prevent the end of the cord from tearing the leaves during sewing, they support the leaves while the mat is standing erect, and they protect the mat in transit. When the first row is finished the foundation twine is threaded through the hole in each stick and a triple knot is made which will not pull through the hole. The row took 3 hours to complete, with two women working.

Parenthetically, it is interesting to notice that this first row is constructed in the same manner as a head roach made of small bunches of porcupine, deer, or moose hair. Although the work is much finer, the only difference in technique is that the steps for the second pair of leaves are omitted, leaving all the short ends on one side of the work. Densmore (1929, pl. 16, p. 161) pictures the process and describes another method of maintaining tension on the foundation twine.

WEAVING

The warp is now laid on the ground for sewing with the weft cords. Pegs are driven into the ground 6 inches from each end of the first row and in a line with that row. The foundation twine is tied to these pegs. Two others are driven beside the mid point of the side sticks, at such a distance apart that the side sticks are 2 inches farther apart here than they are at the ends of the first row. The third pair of pegs is placed near the free ends of the sticks but between them and at such a distance that the sticks are 4 inches farther apart than they are by the second set of pegs (fig. 31). When the mat is finished the sticks keep their flare. The additional width of the mat at the lower edge conforms to the shape of the wigwam. Because the season for making mats occurs late in the year, sewing may be difficult owing to cold, rain, and wind, as it was in the present instance. If conditions become intolerable, work is continued in the house, where nails in the floor replace the pegs. This practice appears to be a transfer from wigwam life.

The leaves are sprinkled with water from a dipper before beginning work and occasionally during the process. The worker sits on the ground with the place where she began the first row before her (pl. 50, *b*). A doubled cord a little longer than the mat is tied securely to the side stick nearest the worker about 7 inches from the first row. It is then threaded into the needle, passed through the upper pairs of warp leaves in pierced warp technique, and fastened to the farther stick, thus moving from right to left on the mat. This operation is repeated every 7 inches except for the next-to-the-last row which is not put in until the mat has been turned over and the other side sewn

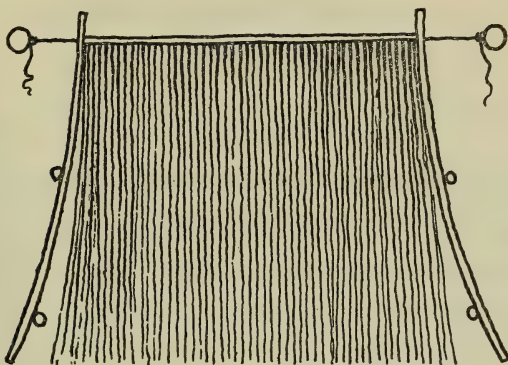


FIGURE 31.—Cattail mat technique: Mat pegged down for sewing.

in the same manner as the first. Then this row is made by plain plaiting (see fig. 20) which binds the two sides of the mat together near the lower edge. This plaiting consists of passing the threaded needle over five leaves that are visible on the upper surface of the mat, then under the lower layer for an equal distance, and so on across. This process is repeated starting from the same point but passing under the leaves passed over before and over those previously passed under. The cords are not drawn up so tightly as to distort the position of the leaves (pl. 52, *a*).

The informants in this study could give no reason for using this row (*ka shka na ni i gūn*) except "that's the way they're supposed to be." It appears to be used to keep the two layers from spreading apart while in use, thereby weakening the mat and impairing its effectiveness.

The manner of sewing each layer is this: the left hand barely lifts a pair of leaves and the right hand inserts the needle on the under side at a point nearly at the center, piercing the thin leaf and the under side of the thick leaf. Then the needle follows the pithy inside channel of the thick leaf and emerges at the far side of the leaf (fig. 32). Eight to ten pairs of leaves are pierced in this way before the cord is drawn through. While the right hand pulls the needle, the left is pressed down on the leaves to keep them in place. This process is repeated until the row is finished. The leaves now lap like the siding on a house, but vertically, and the sewing cord is nearly invisible.

When the fourth row is reached the topmost leaf has become so thin that it must be used as the lower leaf of the pair, and conversely the other is now heavy enough to be treated as an upper leaf. Hence the pair is now given a half twist to reverse their positions, and the work proceeds as before (pl. 52, *a*). About $4\frac{1}{2}$ inches below the last row



FIGURE 32.—Cattail mat technique: Path of needle in sewing a pair of leaves (cross section).

the cattails are trimmed off, and the mat is completed. Densmore (1929, pp. 157, 23) mentions this trimmed edge: "The ends of the reeds were often left free." "The woven edge of the mats was placed at the top, and tied to the framework; the rushes at the other edge of the mat, not being fastened together, had enough 'spring' to assist in holding the mat upright." A finished edge would also tend to slide outward because of its smoothness. Mrs. Cecilia A. Burnette, who saw her grandmother make the mats near Whipholt on Leech Lake Reservation, suggests another reason for this type of edge. In moving the mats to sugar camp in March the lower edge was often found to be embedded in ice and had to be cut off to free the mat.

As Densmore intimated in the paragraph just above, the lower edge was sometimes finished. Apparently this was done only when the mat was to be used as an upper tier, as pictured by Jenks (1900, pl. Lxix). Jenness (1935, p. 113) reports that cattails were "stitched together at top and bottom," while Reagan (1924, p. 117) says they were "strengthened at the edges by being counter wrapped." These two references are not clear enough to confirm the finishing of both edges.

A close view of a section of the completed mat (pl. 51) is very similar to one by Bushnell (1922, pl. 12, b).

The time normally consumed after completion of the first row must be estimated, since in this study the weaver's handicap required that an assistant pick up each pair of leaves to be sewed, keep the sewing in a reasonably straight line, and rip out unsatisfactory work. Cold, stiff fingers slowed the work somewhat, too. Between $4\frac{1}{2}$ and $6\frac{1}{2}$ hours would probably suffice for a single worker to sew, bringing the total time for this sample-sized mat (4 feet $2\frac{1}{2}$ inches by 4 feet $5\frac{1}{2}$ inches) to between $19\frac{1}{2}$ and $21\frac{1}{2}$ hours. Skinner (1926, p. 292) observes that if five or six women are sewing, "two mats are considered a day's work."

Very little on the sewing of cattail mats is to be found in the literature. Densmore's informant recalls one aspect not mentioned elsewhere. She says (1929, p. 120), "We laid the rushes two layers deep on the ground with the ends resting on the cord, and then fastened the ends of the rushes to the cord, after which *we fastened the cord to the pole that was the upper, horizontal part of the weaving frame* [writer's italics]." Later Densmore pursues the idea further (p. 157): "These mats . . . were woven on the same frames as the

[bulrush and cedar-bark] floor mats. The reeds were turned in the same manner to form a selvedge at the beginning of the work but the method of work was entirely different. . . . The reeds were strung together . . . [using] a bone needle, which was passed horizontally through the reeds at intervals of 8 or 10 inches."

Obviously Densmore erred as to the selvedge stitch, since the three mats each employ a different first-row technique. Moreover, the reports of several informants consulted in the present study and other literature on tribes of the western Great Lakes agree that the mat was sewed while on the ground.

Several other writers devote only a sentence to the making of mats, as Gilmore (1933, p. 124), Henry (1897, p. 133), Radin (1928, p. 663), Willoughby (1905, p. 89), and Jenness (1935, p. 113), who notes the double thickness of mats. Lyford (1953, pp. 90-91) largely paraphrases Densmore, but adds mention of the concealed stitch, as does Smith (1932, pp. 340, 423) in his two-sentence summary.

CHARACTERISTICS

In the cattail mat the aborigine's genius for adaptability to his environment is strikingly revealed. In a climate of great extremes, the Chippewa have contrived a rain-repellent, wind-resistant, portable, pliable, obtainable, and lightweight lodge covering. Most remarkable of all, he has hit upon the principle of insulation by means of walls enclosing a dead-air space in which convection currents are retarded by filaments. The walls are the outer layers made up of the hard lower half of the leaves, while the filaments are the inner layers of thin leaf tips.

The weatherproof quality derives from the construction. As mentioned above, the leaves lap like board siding, but vertically, making a rain-shedding covering as mentioned by Gilmore (1933, p. 124), Henry (1897, p. 133), Jenness (1932, p. 89), Lyford (1953, p. 91), and Smith (1932, pp. 412, 423). It was also windproof (*ibid.*, pp. 340, 423). In addition, the first row is contrived "in such a manner that each alternate leaf lies upon opposite sides and covers the junction of two other leaves" (Willoughby, 1905, p. 89). Because of the separation into two layers, "when the rain falls on the mat, the water usually follows the leaves on the inside of the mat" (Hoffman, 1896, pp. 258-259).

Why birchbark frequently replaced cattails for sidewall mats is a pertinent question. Both materials were available in most Chippewa regions, although birch trees were scarcer in some areas. Kane (1859, p. 6) notes, "When the birch tree cannot be conveniently had they weave rushes into mats," and Waterman (1925, p. 463) concurs.

Bushnell (1919 b, p. 614) suggests that the region of large birch trees in Minnesota was at its northern boundary, while farther south, as at Mille Lacs Lake, big birches were not to be had.

Probably bark mats were more durable and certainly more easily and quickly made. The process consisted merely of stripping the bark from the tree, sewing the sheets together, and adding wooden strips to the ends.

Relative ease in moving was undoubtedly a factor in the choice of material. "Unfortunately," says Thompson of birchbark (1916, pp. 116-117), "the cold of winter renders it brittle and liable to accidents; and it must be warmed before it can be rolled up for removal; and the same to unroll it." Henry (1897, p. 133) asserts, "Bark . . . is much lighter and less bulky." These qualities were important, for, as Kohl (1860, p. 10) says, "The [birchbark] *apakwas* are so arranged that every woman has two to carry, in addition to the other 'plunder'. Every little girl also has one to carry." But Skinner (1921, p. 247) notes in his study of the Menomini,

Though bulky, the [cattail] mats are not heavy. They are rolled up lengthwise, and the culinary utensils are placed inside. The whole is then made fast by lashings of *wi'kop*, or basswood-bark. The load is packed longitudinally on the woman's back, and is supported by means of two packstraps, one around her waist, the other around her chest and shoulders. It projects far over her head, and gives her a remarkable appearance as she trudges along.

Obviously birchbark is less bulky, and the writer's study of the weight of two coverings of each kind confirms the advantage of bark in this respect also. Per square foot it weighed 2.05 and 3.46 ounces compared with 3.66 and 3.83 ounces for the cattail mat.

Apparently preference changed with the seasons. Says Henry (1897, p. 133), "With these [cattail] mats the Saulteurs construct their winter tents and cabins. They are warm, yet airy, and far more comfortable than the birch bark covering or the leather tents of the Meadow Indians. The Saulteurs use bark for the summer only, as it makes a cooler cabin than the rush mats." Smith (1932, p. 412) adds that the Ojibwa "can even live very comfortably in their [cattail mat] wigwams in sub-zero temperatures." Kane (1859, pp. 7-8), however, equates the birchbark- and cattail-covered tipis: "These lodges are much more comfortable than one would at first suppose from their loose appearance—that is, as far as warmth is considered."

A very different opinion of the winter lodges of the "Chippaways (or Oojibaways)" is expressed by Thompson (1916, pp. 246-247). They "are mostly of rush mats neatly made, sometimes of Birch Rind, or Pine Branches, always low, and seldom comfortable." He goes on to cite the summer use of "Birch Rind, sometimes rush mats, and pine branches."

Clark alone (1885, p. 112–113) finds an opposite seasonal trend and offers an explanation. "They use quite extensively," he says, "reed matting for the sides of the summer lodge, and birch bark for the roof. The matting can be easily transported, and it is claimed that mosquitoes do not infest these lodges as much as other dwelling-places of either skin, canvas, or wood."

USE OF MATS

Consulting the list of cattail mat illustrations that follows will suggest that by far the most common use of these mats was as exterior sidewall covers for domed wigwams (pls. 52, *b*; 59), but they were used as covers for other structures, too. Densmore (1929, pl. 6, *a*) pictures a gabled rectangular lodge with matting sidewalls, and Beaulieu refers to one also (Charles H. Beaulieu quoted in Clark, 1885, p. 376). McKenney (1827, p. 269) mentions a juggler's tent covered with mats, presumably cattail. Smith (1925 *b*, fig. 21; 1932, p. 340) describes and pictures a long domed Mide lodge with matting sides, and Lyford (1953, p. 22) concurs in this use of mats "in rainy weather." She also (p. 17) cites their use on the peaked lodge with long ridge pole, as does Thompson (1916, pp. 246–247). Mrs. Wadena recalled seeing this lodge as well as the domed one, while Jenness (1935, pp. 112, 113) mentions the peaked lodge and tipi. Wissler (1931, p. 111) cites the tipi, which Kane describes and pictures (1859, pp. 6–7, No. 1; Bushnell, 1922, p. 10, pl. 7, *a*; Bushnell, 1940, fig. 1). Bushnell (1922, pl. 8, *a*) shows a tipi.

Sometimes cattail mats were doubled against severe winds. They were fastened to the inside according to Bushnell (1919 *b*, p. 615; 1922, p. 14), Hilger (1939, p. 143; 1951, p. 137), and Lyford (1953, p. 90). Whether inside or out is not clear in Densmore's reference (1929, p. 23). Incidental to their function as wall coverings was the part played by cattail mats as an auxiliary to transportation. Skinner, quoted above, notes that in moving camp they formed a container in which culinary utensils might be carried. Densmore's informant recalls from her girlhood in the Mille Lacs Band:

We rolled the blankets inside the mats; and if there was a little baby, my mother put it inside the roll, cradle board and all. It was a warm place and safe for the baby. [Densmore, 1929, p. 120.]

CATTAIL-MAT ILLUSTRATIONS IN LITERATURE CITED

Domed wigwams with matting sidewalls

- Brower, 1900, pl. 28 on p. 68 and pl. 34 on p. 86
- Bushnell, 1919 *a*, pl. 2, *b*, fol. p. 111 (after Brower p. 68)
- Bushnell, 1919 *b*, pl. 3, 1, 2, fol. p. 617 (after Brower pp. 86 and 68)
- Bushnell, 1922, pl. 6, *b*, opp. p. 10

- Densmore, 1929, pl. 3, *b*, opp. p. 24
 Hilger, 1951, pls. 26, 1; 27, 3; 28, 1, 3—all fol. p. 187
 Jenks, 1900, pl. LXVII, *B*, opp. p. 1043; pl. LXIX opp. p. 1053
 Kane in Kidd, 1946, p. 5
 Lyford, 1953, pl. 50 on p. 91
 Smith, 1932, pl. 46, fig. 2, fol. p. 460
 Waterman, 1925, pl. 1, 1, fol. p. 485 (after Bushnell, 1922)

Other lodges using matting

- Bushnell, 1922, pl. 8, *a*, opp. p. 12: tipi
 Densmore, 1929, pl. 6, *a*, fol. p. 28: gabled lodge
 Kane, 1859, No. 1 on p. 7; in Bushnell, 1922, pl. 7, *a*, opp. p. 11; in Bushnell, 1940, fig. 1 on p. 5: tipi
 Smith, 1925 *b*, fig. 21 on p. 43: Mide lodge

Needles

- Densmore, 1929, pl. 9, *a* (*g*), opp. p. 36: bone needle
 Thayer, 1935, p. 3: bone and steel needles (sketches)
 Thayer, 1940, p. 97: bone needle (sketch)

Technique

- Bushnell, 1922, pl. 12, *b*, fol. p. 16: section of mat
 Smith, 1925 *a*, fig. 18 on p. 37: Meskwaki (Sauk and Fox) woman starting mat

CHECKLIST FOR DISTINGUISHING RUSH AND CATTAIL MATS

	<i>Rush mat</i>	<i>Cattail mat</i>
Chippewa name of mat...	ǎ na' kŭn.....	ǎ pŭk' we
Region of manufacture...	Great Lakes area.....	Great Lakes area
Time to harvest chief material	July.....	October
Chippewa name.....	gami' wŭshk, etc.....	ǎ pŭk wesh' kwe ǎk
Botanical name.....	<i>Scirpus validus</i> Vahl. or <i>Scirpus acutus</i> Muhl.	<i>Typha latifolia</i> L.
Appearance.....	Leafless, whiplike.....	Leaves of plant with "weiner on a stick" fruit
Habitat.....	Water at edge of lake or slow stream	Low ground
Method of harvesting....	Pulling.....	Cutting
First processing.....	Trim, kill with hot water, dry and bleach a week	Split plant, sort, trim, dry 5 days
Coloring.....	Various dyes.....	None
Tools for manufacturing.	Cutting tools.....	Cutting tools and large, flat needles
Uses of cord.....	Tying edge, weft, and lashing	Foundation, tying edge, and sewing
Other equipment needed..	Frame for suspending mat	Side sticks and pegs
Further processing of material	Keep damp.....	Soften ends, sprinkle all over

CHECKLIST FOR DISTINGUISHING RUSH AND CATTAIL MATS—continued

	<i>Rush mat</i>	<i>Cattail mat</i>
First row construction---	A pair of cords----- Cord free or held with teeth Lacy edge----- Ends carried along from one group to another	Foundation and tying cords Cord under tension Tight edge Ends tied in immediately
Position of mat in weaving	Lashed to upright frame-	Lying on the ground
Method of weaving-----	Left to right----- Under-one-over-one (and possible twining) Varies from closely woven to wefts 1 inch apart	Left to right Sew through warp, and two rows of under-over Sewn every 7 inches
Ornamentation-----	Design by weave variation and color	None
Size-----	2 to 3½ feet wide × 4 to 9 feet long	3 to 6 feet wide × 9 to 20 feet long
Finish of side edges-----	Left: weft looped around edge Right: tied in a thicker edging or fringe	Sticks on both
Finish of lower edge-----	Similar to first row-----	Usually unfinished
Layers-----	One-----	Two
Use-----	As carpet, as bed, to line wall, as table, as seat, on bottom or top of grave	Covering for lodge exterior sidewall and possibly roof; to line wall
Characteristics-----	Wears well under pressure and abrasion Open weave not wind or water resistant Rollable----- Lightweight----- Compact----- Exercises artistic talents of weaver	Fragile under pressure and abrasion Water repellent, wind resistant Rollable Lightweight Bulky Functionally artistic

MINOR MATS

REED MAT²

TECHNIQUE: KNOTTED WEFT

What may be called knotted-weft weaving employs paired weft elements, of which one continues behind the warp elements and the other in front of them. Between every two warp elements the pair of weft elements is knotted.

² The description of this mat, a specimen of which was examined by the writer in August 1962, was added after this paper had gone to press.

The product of this technique may be indistinguishable from that of twined weave except for the twisting (instead of knotting) of weft elements in the latter that brings one element alternately to the front and the back of the warp elements. However, by using knotting, the technique moves away from the common concept of weaving, in which elements simply cross, and toward the realm of network, in which crossing elements are knotted. Any presentation of knotted-weft technique is lacking in the sources consulted for this study. Nevertheless, it falls within the broad limits of weaving accepted here.

MANUFACTURE

A completed reed mat was examined by the writer in August 1962 at Fort Mille Lacs. Robert Spading, of the Fort, who had observed the making of the mat there in July 1961, outlined the process which is here augmented by facts derived from examination of the finished mat. Two Chippewa women of Mille Lacs Reservation, Minn., made the mat: Mrs. Maggie Nequonabe, about 73 years of age, who knew the technique, and Mrs. Susan Shingobe, a younger woman to whom the process was unfamiliar.

Materials needed are strips of unprocessed *wi'gōōb*, about one-fourth of an inch wide, and freshly gathered stalks of the reed (*Phragmites communis* Trin. var. *berlandieri* (Fourn.) Fern.), the common lowland grass 8 or 9 feet tall recognized by the plumed head, inch-wide leaves, and stalk with joints every 3 to 5 inches. The fairly tough stalks, from one-eighth to three-eighths of an inch in diameter, are cut with a knife when mature enough to use (in this case at the end of July). The workers strip the leaves from the heavier part of the stalks, bundle the reeds, and cut off the tender flexible tips.

The work is suspended by two strands of *wi'gōōb* from a frame similar to that used for cedar-bark and rush mats. The strands are hung at a distance from each other about 10 inches less than the width desired for the mat. Two weavers work simultaneously, each at a strand on the end of which she kneels to hold the work steady (pl. 60, *a*). As the weaving progresses upward, the mat is lowered by an additional length of *wi'gōōb* allowed for the purpose. When the mat reaches the ground the weaver no longer kneels on her strand, but relies on the weight to steady the work. At a point within convenient reach each worker securely knots to the suspended strand a strip about twice the length desired for the mat. A reed is laid horizontally between the knotted strands in such a way that the suspended strands are at the far side of the reed from the workers, and the free strands are on the near side. Each worker knots the free

or active strand around the inactive hanging *wi'gōōb* above the reed and about 5 inches from the end of the reed (fig. 33). The rest of the work is merely a repetition of the adding of reeds and the

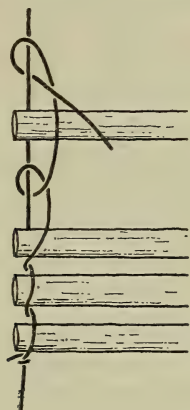


FIGURE 33.—Reed mat technique.

knotting of *wi'gōōb*. At completion of the mat each pair of strands is tied in a firm knot, and the small ends of the reeds are trimmed off.

The knot used in weaving is a half hitch, in which the free end, pointing toward the left, is crossed over the inactive strand on the side toward the worker, is doubled back behind the strand so as to point to the right, and is pulled toward the worker through the loop formed by the active strand until the knot is fairly tight.

The berry-drying mat examined measured about 3 by 7 feet. In use it was supported by a tablelike structure of sticks and covered with grass to prevent the berries on top from falling through. A mat of fresh reeds will permit a fire hot enough to dry blueberries in a day. At the conclusion the mat is laid on a blanket, the grass is plucked out, and the berries fall onto the blanket.

A presumably Chippewa mat similar to this one was collected in July 1956 by John Macfie of Parry Sound, Ontario, Canada, in an abandoned blueberry-picking camp near Pickle Lake, Ontario, about 115 miles northwest of Lake Nipigon (pl. 60, *b*; *Crafts of the Cree*, 1957, p. 57). Through Chippewa informants, Isaac Lawson at Pickle Lake and Joe Wesley at Sioux Lookout, to the southwest, Mr. Macfie learned that his find was a *pas' soomin an*, used in blueberry drying (letter to the writer [May 1961]). Details on the mat were provided by Edward S. Rogers, of the Royal Ontario Museum, Toronto, Ontario, where the mat is deposited:

The ends of the mat are secured each to a length of speckled (?) alder. The reeds are secured parallel to each other with 7 rows of lacing, each consisting of 2 strands of string. These 2 strands of string are not woven by twining but

appear to be a somewhat similar technique Occasionally the bottom strand appears to be looped twice over the top one. The mat is approximately 3 ft. wide and 4 ft. long. [Letter to the writer, July 19, 1961.]

An accompanying sketch showed a knotted weft identical to that in the Mille Lacs mat. However, the use of seven rows of weaving, within easy reach of two weavers, held the reeds straighter. This condition, together with a tighter half-hitch knot that brought the reeds closer together, provided a surface that, over most of its area, would not require grass to keep the berries atop the mat. Again the material appears to be a *Phragmites* reed.

Densmore once identifies the reed on her "frames for drying berries" as *Phragmites phragmites* (L.) Karst (1929, p. 157), but elsewhere uses the newer name *Phragmites communis* Trin. (1928, pp. 378, 379). Her details correspond closely with those above:

They were made on a frame like the preceding [bulrush, etc.] mats and were woven with basswood twine, but differed from the floor mats in that the twine was placed at intervals of 8 or 9 inches instead of close together, and the twine was knotted between each reed. This separated the reeds, and in the finished mat produced spaces through which the air could circulate, thus assisting the drying of the berries. These mats were about 24 by 36 inches in size. [Ibid., 1929, p. 157.]

Perhaps similar are Seymour's "mats on a scaffold over a fire" at the Upper Mississippi and in northern Minnesota (1850, p. 183) and Keating's "fine sieve made of reeds, secured in a square frame" (1825, p. 156), both for drying wild rice.

In speaking of the Saulteaux north of Lac Seul, Ontario, who were on the periphery of Chippewa culture, Skinner (1911, p. 127, fig. 45) describes "mats of bundles of straw . . . sewed together These were formerly placed on the floor of the lodge to sit or recline upon." The sketch indicates a variant of reed-mat technique: the paired weft is knotted between bundles with not one but two half hitches.

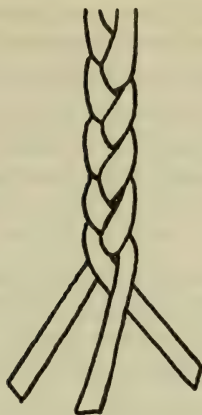


FIGURE 34.—Details of weaves: Braiding.

CATTAIL AND RUSH MATS (OVAL)

TECHNIQUE: BRAIDING AND SPIRAL WINDING

“In braiding, three or more lengthwise or warp strands are crossed diagonally and lengthwise in such a way that each of them lies alternately over and under one or several of the others thus making a texture with the use of warp threads only” (Lyford, 1953, p. 66). (See fig. 34.)

DISTRIBUTION

Except at Parry Island in Georgian Bay, Lake Huron, mats braided from natural materials appear to have gone unrecorded for the Chippewa. This lack of interest may be due to the resemblance of these mats to the braided rag rugs of Europeans. Even should they prove to be the result of borrowing, they remain an interesting example of the adaptation of familiar materials to a new technique.

However, mats braided of natural materials have been widely distributed in the Great Lakes area for some time. Informants recall such mats of cattails or rushes from their childhood in a range from a point in Manitoba 12 miles north of Pembina, to White Earth Reservation and Gull Lake north of Brainerd, both in Minnesota, to the Superior, Wisconsin, area.

Johnson (1929, p. 203) says of Parry Island:

Braided cornhusk mats, similar to the Iroquois type, are found in practically every household. That these mats follow the distribution of the cultivation of corn seems to go without saying; it appears as though their origin might be traced to southern sources. One must consider, however, the braided basswood

mat which is made by the Algonquin. The technique of these two types of mat seems to be identical, but their relationship must await further investigation.

The Iroquois cornhusk mat mentioned is described and pictured by Lyford (1945, p. 64, pl. 58): "By a technique of braiding, coiling, and sewing, the shredded [corn] husks were used to make mats." The picture shows it to be very like the cattail mat of this study.

MANUFACTURE

The chief informant was Mrs. John Benaïse (Little Partridge), whose Indian name is *Ūm boy ash' i*, 'The wind blowing up.' She was born in Manitoba and in 1957 resided on the southwest shore of Red Lake, Minnesota, on the reservation of the same name. She had learned the technique from her grandmother.

The principal material is leaves of the same cattail as used for the cattail mat (rectangular), but cut when the plants are only partly grown (July 9). The leaves are spread out on the grass to dry for 3 days, and require no other preparation. They are braided in the same way as rag rugs, except that each of the three strands is made up of three to five leaves. Before a leaf is completely used another is added. Braids average nearly 1 inch in width. The end of the braid is tapered off to nothing.

Thread for sewing is the ubiquitous *wi'gōōb* (basswood bark) (pl. 53, *a*) in a darning needle. Blind stitching is used to conceal the thread; that is, the thread is slipped through the loop formed by the bend in an outside warp strand, and passes through alternate loops of adjacent coils of braid. Just as for oval rag rugs, work is begun by sewing the first portion of the braid (about 9 inches) to the next portion, then winding the rest around and around this core until the desired size is reached (pls. 53, *b*; 54, *a*).

The mat in this study is $27\frac{1}{2}$ by $34\frac{3}{4}$ inches. Nearly 5 hours of diligent work was required for sewing the mat after the braids were finished. Mats of this size or larger were made by Mrs. Benaïse and sold in communities off the reservation for scatter rugs. For this purpose she sewed them with doubled white No. 10 cotton thread.

To flatten, she advised, "Put it under the mattress." However, care must be taken to dry it promptly and thoroughly, lest it mold. When dried it is a pleasing combination of shades of gray-green, cream, tan, and brown. It is practical for light use on a floor.

Smaller mats are made from bulrushes in nearly the same way. Mrs. Benaïse pulled the slender, short rushes growing in Red Lake and cut off the lower ends. She merely spread the rushes out for 3 days to dry, but another informant disagrees with this procedure. Mrs. John Mountain (Mary Smith) of Redby, Red Lake Reservation,

and formerly from Gull Lake north of Brainerd, says they should be killed with hot water "so that they won't break so easily and get stiff." However, Mrs. Benaise's untreated rushes result in a mat of flexibility satisfactory for table use. Braiding is done with only three rushes, producing a braid three-eighths of an inch wide. The braids are sewn together with *wi'gōōb* or thread (pl. 54, *b*), and Mrs. Mountain specified a bone needle. In other details the process was that of the preceding mat.

Rugs braided of rags in this manner are noted by Lyford (1953, p. 95) and Hilger (1939, p. 167). The latter found that six- or eight-ply rugs outnumbered traditional rectangular bulrush mats nearly ten to one in 1938 on White Earth Reservation, Minnesota.

SWEETGRASS MAT

TECHNIQUE: COILING

"In coiling, a horizontal warp is sewn over and over with a vertical weft thread of flexible material each stitch interlocking with one immediately beneath it" (Lyford, 1953, p. 60). (See fig. 35.)

Mason (1904, p. 195), who treats matting as a form of basketry, says, "Coiled basketry is sewed, not woven," and defines sewing as "the joining of parts with an awl and splint," which in the case of sweetgrass mats are a needle and thread. Yet on the same page he defines pierced warp as "the form of weaving in cattail . . . when

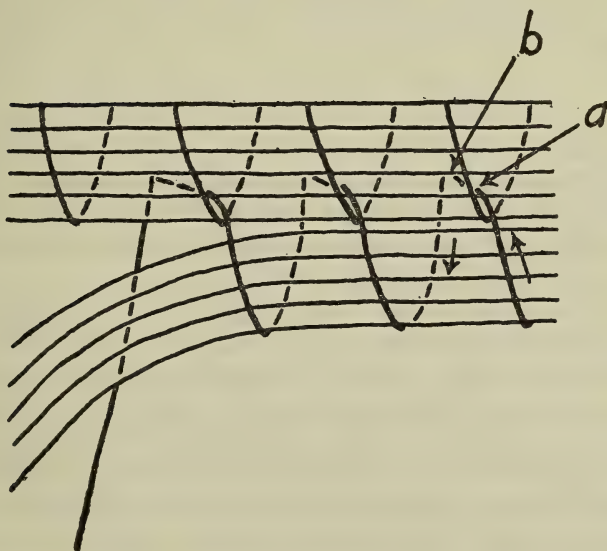


FIGURE 35.—Details of weaves: Coiling used in sweetgrass mat.

the weft strings pass through the warp." Since a needle and thread is employed in both, there seems to be no warranty for saying one mat is weaving and the other is not. As Mason says elsewhere (p. 189), "No wide gulf separates the different varieties of textiles, however, beginning with such coarse products as brush fences and fish weirs and ending with the finest lace and needlework." The broader interpretation of weaving is used in this paper.

BACKGROUND

The writer did not observe the making of a complete sweetgrass mat, but in August 1961 elicited from two practicing weavers of sweetgrass their directions for making a mat. In essential agreement except for the divergencies noted below were Mrs. Susan Pemberton, living on Cass Lake in Leech Lake Reservation, and Mrs. Margaret Bigbear of Ponsford on White Earth Reservation.

The utilization of sweetgrass for mats, baskets, and ornamentation of baskets of other materials, while rare today, is not extinct. The writer found other sweetgrass weavers in the communities of the informants as well as at Naytahwaush on White Earth Reservation and Garden River Reserve, Ontario, near Sault Sainte Marie. Volney Jones in his fine all-inclusive paper (1936) reports them for Walpole Island, south of Lake Huron (p. 23). Smith (1932, p. 419) mentions them at Lac du Flambeau Reservation, Wisconsin, and the Leech Lake, Minnesota, area. The present study found all the sweetgrass workers to be women, and Jones concurs with but one exception (1936, p. 28).

GATHERING AND PREPARING MATERIALS

The popular name "sweetgrass" derives from its vanillalike odor, which develops as it dries. The scent sometimes persists for years, and is especially noticeable when the grass is damp. The Indians say that when they smell this odor on entering a room where there is sweetgrass, they know it is going to rain.

The scientific name of the "Indian's perfume" was found in this study to be *Hierochloe odorata* (L.) Wahlenb. Jones (1936, p. 21) reports this name and a number of synonyms (*Hierochloe borealis*, *Savastana odorata*, and *Torresia odorata*). Densmore (1928, pp. 294, 296) finds the last-named and adds "(L.) Hitchc." Smith's name (1932, p. 419) of "*Anthoxanthum odoratum* L." is refuted by Jones (1936, p. 22). The Chippewa name was variously given as *wicko'bimûcko'si* (Densmore, 1928, pp. 294, 298; Smith, 1932, p. 419) and *wicko-mash-kossi* (Lyford, 1953, p. 63).

Sweetgrass occasionally is found in dry lands, but usually grows near a lake or other water. It may be recognized by its leaves that are shinier and wider than those of other grasses near it, and by its rosy or purplish lower end.

The glossy upper surface of the leaves and the semierect habit are features useful in its recognition.

The grass is harvested from the middle of July [cf. *ibid.*—the middle of June] until it begins to dry in September. . . . The midseason product is considered most desirable. The leaves are gathered by grasping the shoots firmly near the ground and pulling steadily until they break loose from the rootstocks, which are an inch or two under the surface. Careless jerking is liable to break the shoots above the ground and to leave ragged ends and cause waste. Gathering is slow and tedious since the grass is usually scattered and mixed with other plants. [Jones, 1936, p. 22.]

A family of several members was reported to have spent a morning picking a bunch of sweetgrass $1\frac{1}{2}$ inches in diameter. Maximum length of the grass is about 3 feet. Any adhering root is picked off at once. That it grows readily is apparent from the fact that Mrs. Pemberton reported that roots she had discarded grew into plants.

Mrs. Bigbear stressed the "cleaning" of the grass (i.e., discarding the short pieces and reddish lower end) as essential to a pretty mat, while Mrs. Pemberton used the colored ends but trimmed off the heavy part. Jones' informants (1936, p. 28) cut off the coarse bases just before beginning the sewing. The grass is tied near its lower end in bunches about one-fourth of an inch in diameter. Mrs. Bigbear then tied the bunches together in pairs and threw them over a line in the house to dry for about 2 days. Mrs. Pemberton hung the bunches in the house or outdoors in the shade for two weeks after wrapping each bunch spirally with string for about two-thirds of its 3-foot length, so that when it shrank in drying it would not slip out of the string. She mentioned that if the grass was used before it was entirely dry the completed work would not be tight and firm after the grass finished drying and shrinking. Grass that is not to be used at once is wrapped and tied firmly in newspapers and stored away. Mrs. Bigbear dampened her grass before using it by moistening a towel and rolling up the grass in it.

Two methods of drying are reported by Jones (1936, pp. 23-24), outdoors in the shade and indoors over a stove. He, too, found the cured grass to be "wrapped tightly in newspapers, and put in a dark place." He adds, "If the grass is allowed to dry quickly in the sun the color and the odor are soon lost, and the grass becomes stiff and brittle. Some of the color, odor, and pliability can be retained for 2 or 3 years if the grass is properly cured immediately after gathering." He observed that before using the grass dried outdoors, "it is dipped

into boiling water and withdrawn almost immediately. This restores the pliability and brings out the odor." However, the stove-dried product after 2 years had retained its color, odor, and sufficient pliability to be used without dampening.

Grass prepared for use is shown in Densmore (1928, pl. 49), Jones (1936, pl. 3, 1), and the present paper (pl. 55).

MAKING THE MAT

To begin a mat, the root ends of about 10 shoots, used without separating them into their approximately 16 separate leaves, are wound into as small a coil as possible. A sewing needle is threaded with a single or double strand of lightweight cotton crocheting thread knotted at the end. Jones (1936, p. 27) specifies No. 10 thread to which beeswax is applied to make the sewing easier on the worker and on the strands of grass. Sewing is begun in the shape of the spokes of a wheel, each stitch passing around the outside of the coil and halfway through the opposite coil. This step as described by Jones (1936, p. 28) differs in beginning with knotting the end of the bundle and sewing the first coil to it.

After the completion of a round, the interlocking stitch is begun. The thread encircles the free end of the grass and passes through the point of the V formed by the thread on the previous coil (fig. 35, *a*), and then through the coil itself (fig. 35, *b*). When the thread returns to encircle the free end again, it has completed an inverted V linked through the V of the first coil. Thus the thread may be pulled tight without damaging the grass, and a very firm basket may result.

In order to line the stitches up in a pleasing pattern, the needle is always inserted just to the right of the thread of the previous coil, and about a third of the way from the edge of that coil, so that the stitches in successive coils overlap slightly. The result is a diagonal tendency of the rows of thread to the right, which may be exaggerated to the interesting central design in the grass mat of plate 55 made by Mrs. Pemberton. The same design is visible in Mason (1904, pl. 124), although this may be a basket rather than a mat.

Usually the work is held in the fingers of the left hand, with the long end of the coil to the left and closer to the worker than is the previous coil. Holding it tightly is said to keep the mat flat. The work is rotated toward the right as work progresses. This position allows maximum control over the placement of stitches, and a natural slant to the angle of the needle that brings it out at the back at a point midway through the coil and centered between two threads of the previous coil. The result is an attractive bricklike pattern on the wrong side.

Shortly before a strand of grass runs out, another strand is added to bring it up to the original thickness. The new ends are hidden among the old so as not to be visible from the right side.

As the circumference increases and the "spokes" of stitches become farther apart, it may be desirable to interpolate more spokes. It is sufficient to add a row only after alternate rows. To do this, a stitch is not lined up directly with that of the preceding coil, but is made a little farther to the right. The next stitch, instead of lining up with the following row, again utilizes the same row, but tends somewhat to the left. The next stitch follows its normal row, and the successive one is doubled, and so on around the circle once. Thereafter the stitches line up with those of the preceding coil.

Another answer to the widening space between rows is to interpolate a row of zigzag grass, as in the all-grass mat in plate 55. To do this, the last stitch is doubled and the thread is wound around the long end of the coil for $\frac{3}{4}$ of an inch to 1 inch, with the thread spaced at the same intervals as will be used between the rows that will be added when the zigzag pattern is finished. The grass is bent with care at a right angle toward the mat, the wrapping is continued an equal distance, and the strand is joined with a double stitch to the mat proper at a point where a row of stitches ended. The grass is bent at a right angle away from the mat, and the process is repeated to the point where the zigzag pattern began. Here, after the free end is double-stitched, there is a choice of several terminations. The free end may be carried to the back side of the mat, and cut off. It may follow closely the first element of the zigzag and be wrapped with it. Or it may bend more sharply than the first element and form an acute angle.

Thereafter additional rows of coiling are added at will, starting at the outside bend of a zigzag with a double stitch if one of the first two methods of termination was used. For the first coil, the thread is wrapped around the long end at the interval desired, until the outside angle of a zigzag is reached and the grass is secured to it by a double stitch. The process is repeated all the way around the circumference. Successive rows are like those in the central portion. When the desired size is reached, work continues until the strand of grass ends.

A row of overcasting may be added in which the thread passes through the grass at the same point as the last row, but in the opposite direction, giving an attractive zigzag stitch. Another row of zigzag strands may be used as a finish instead. The smaller mat in plate 55 shows the former edge, and the larger utilizes the latter and also interpolates birchbark with porcupine quill embroidery.

Details of the process given by Lyford (1953, p. 64) and Jones (1936, pp. 28-29) are similar except for the latter's method of adding rows of stitches. "When they become as much as three-eighths of an inch apart," he says, "a stitch is made midway between two of the previous round, and thus a new radius is begun."

When birchbark is used in mats, it is usually ornamented with quill-work. This must be applied before the sweetgrass is sewn on because a lining of bark is required beneath the embroidered piece, to cover the cut ends of the quills. The grass is sewn onto the bark with stitches through both layers and about one-fourth of an inch from the edge. Warping of the bark is minimized by running the grain of the two layers in opposite directions, and sometimes a piece of cardboard is interposed as a further precaution.

Usually a simple isolated design element is made from the quills. Coleman (1947, p. 40) mentions "leaves, trees, flowers, or geometric figures," some of which are discernible in her three pictured mats (pl. 6, *b*—one of which may be a basket), as well as in plate 55 of the present paper. Today, quills are dyed with commercial dyes except when an all-white pattern is desired or when the natural brown tip of the quill (pl. 55) is used in creating a brown and white design. The finer the quills the more artistic the result that can be obtained. Before being used, the quills are soaked half an hour or until damp. The design is drawn on the wrong side of the bark and holes are punched with an awl on the right side, from which side both ends of the quills are inserted, sometimes flattened and sometimes not. The writer has tweezers made of metal by the husband of a quill-worker to facilitate pulling the sharp quills through. The bark may be backed up with a piece of oilcloth to prevent its splitting. All but one-fourth of an inch of the quill-ends is cut off. Mrs. Bigbear was careful to burn up the cut ends at once.

In older specimens black thread predominates, with green second. Some present-day workers use various bright colors singly or combined that eclipse the subtle shades of the grass itself.

USE OF MATS

Ethnologists speculate that the coiling technique is a trait of great age among the Chippewa (Jones, 1936, pp. 29-31; Mason, 1904, pp. 376-377). Mason quotes Charles C. Willoughby's belief that it dates back to pre-White contact, while Jones brings up the possibility of modifications due to the influence of the White man. It appears likely that the sweetgrass mat was a product of this influence. While a coiled basket or bowl would be useful to a primitive Chippewa, a fragment of bark could be readily procured to serve for a plate. Only the

table of the European settler had need for an ornamental mat to use under teapots or hot dishes.

MATS OF UNKNOWN TECHNIQUES

References to several minor mats are not clear as to the techniques employed but extend the range of materials used in matmaking.

Black ash and cedar strips were also used in making inside-wall mats for the wigwam.

The Indians looked for straight cedar or ash that was free from many lower limbs. The trees were cut to the desired length, peeled and pounded in order to break the trunk up into splints. These were then split down to the desired thickness. The splints were strung, each splint lapping over the other. As in basket weaving, the cord was worked over the splints a foot apart. [Parker, MS., 1936-1940.]

"A mat woven of narrow strips of basswood bark," says Densmore (1928, p. 311) in describing maple sugarmaking, "was placed over an extra kettle, and the sirup was strained through this mat." This could be similar in construction to her gum-boiling bag of basswood bark (*ibid.*, p. 158; pl. 55, *a*), which was "woven somewhat like drying frames for berries." (See pp. 265 ff.) Although the techniques of the finished products look much alike, twined weave is used for the bag and knotted weft for the drying mat. Probably the fine straining mat was not intended in Chamberlain's reference to basswood or cedar-bark mats on rice-drying racks of the Mississagua (1888, p. 155). Certainly he implied some other process when he said, "Of the inner bark of the pine and basswood they made beautiful mats" (*ibid.*, p. 156).

Mats were sometimes made of three small rushes: the bog-rush (*Juncus stygius* L.), 3 to 12 inches high, used at Bois Fort, Minn. (Reagan, 1928, p. 245); the soft rush (*Juncus effusus* L.), 1 foot high, "for weaving little bags, pouches, and small mats such as table mats . . . [and] larger mats, as much as three feet wide and three or four feet long," southwest of Lake Huron (Gilmore, 1933, p. 125); and Dudley's rush (*Juncus dudleyi* Wiegand), 1 foot high, at Leech Lake, Minn. Smith says (1932, p. 419), "The Pillager Ojibwe use this tiny rush in their finest mat work, for small pieces." On page 418 he lists woolgrass (*Scirpus cyperinus* [L.] Kunth.), noting that "the Flambeau [Wisconsin] Ojibwe use these small rushes for a certain kind of mat." Several of the techniques treated herein may be used for these small mats.

The disappearance of mat weaving is observed by Skinner (1914, pp. 316-317) among the Plains Ojibwa branch known as the Bungi, of Manitoba: "While the art of weaving was absent from the Plains,

the Bungi for a long time retained it, though it is obsolescent today Reed mats . . . were . . . made, and a few examples are yet to be seen." If these were like the reed mat discussed on pages 265-268, they probably would not have been singled out as worthy of mention. Reed here presumably means rush or cattail.

A final reference cites materials discussed above but suggests a new way of preparing and perhaps of using them at Parry Island in north-eastern Lake Huron:

Mats made of rushes were in everyday use for both the outer coverings and the floors of wigwams. The rushes [cattails or bulrushes?] were gathered about the end of August and soaked for a week or more in cold water. They were then split while still soft, dried in the sun, rubbed between the hands, and pleated [braided or woven?]. Many women did not soak them at once, but tied them in bundles and stored them away in a dry place for treatment later

A few mats were pleated, not from rushes, but from the husks of corncobs. [Jenness, 1935, p. 113.]

SUMMARY

Chippewa mat weaving is an art rapidly disappearing in Minnesota. Over 50 sources that give some information on Chippewa mats fail to record with any completeness the technique of manufacturing them, with but three exceptions.

This paper presents in detail the techniques for cedar-bark and rush floor mats and cattail lodge-cover mats, as well as minor mats of braided cattails and rushes. These processes were observed by the writer and her husband on Chippewa reservations in northern Minnesota, July and October 1957 and July 1961. Principal informants were Mrs. Peter Goodsky of Nett Lake, Mrs. John Benaise of Red Lake, and Mrs. Maggie Wadena of Mille Lacs Reservations. The details of making a sweetgrass mat were obtained in August 1961 from Mrs. Susan Pemberton of Leech Lake and Mrs. Margaret Bigbear of White Earth Reservations. The reed mat was studied in August 1962.

(1) The technique employed in cedar-bark mats is plain and twilled plaiting.

In late spring, bark is stripped from *Thuja occidentalis* L., the white cedar. The dark outer bark is discarded. The inner bark is cut to the desired length or width of the mat, and slit into narrow strips which are split into two layers. Some of the strips are dyed with natural or commercial dyes. One end of each shorter or warp strip is fastened to a foundation cord in such a way as to conceal the cord and the end of each strip. The cord bearing the strips is lashed along a stick that is then tied to upright poles, with the warp strips hanging down at a height convenient to the weaver.

A weft strip is carried from left to right across the warp in plain or twilled plaiting, each end being fastened in a way similar to that used in the first row. The final row employs the same selvedge technique. Thirty-three man-hours were required for the mat in this study.

Now produced for sale, these mats were formerly used as ground coverings, partitions, or doors, in the drying of food and smoking of meat, or sometimes as liners for the walls of wigwams.

(2) The technique employed in the rush mat (large rectangular) is plain plaiting, with possible twining.

A confusion of terminology prevalent in the literature referring to two mats may be clarified by calling the plant used for this mat bulrush or rush (a *Scirpus*) and that for the other mat cattail. Often a student may determine which mat is intended by writers only if he knows the differences between the two types.

Bulrushes are pulled in midsummer, trimmed to the width desired for the mat, boiled, and bleached in the sun. A few are colored with natural or commercial dyes. Each rush is tied into the selvedge, the ends being concealed in the decorative edging. This row is lashed to a pole which is fastened to uprights at a height suitable for weaving.

Rushes become the warp, and twine, either commercial or made from basswood bark, is the weft. Weaving is from left to right in plain over-under plaiting except for variations to form patterns. At each end the weft twine is fastened to side-selvedge twine. The last row is like the first. Time used totaled 121 hours.

Once extensively used on the ground or the inside walls of wigwams, the rush mat is still sometimes seen. Its suitability for primitive life probably accounts for its preferment over cedar-bark mats.

(3) The technique employed in the cattail mat (rectangular) is pierced warp, with two rows of plain plaiting.

When the *Typha latifolia* L., or cattail, is mature in fall, the leaves are cut, separated, bundled, trimmed, and dried. One end of each pair of leaves for the warp is fastened to the foundation twine by means of a strong tying cord, and side sticks are added for strength. The resulting warp is pegged down to the ground and sewn through with long flat needles at 7-inch intervals. The next-to-the-last row is not sewn but plaited. The lower edge is usually unfinished. Time consumed for the small mat in this study would probably be about 20 hours under normal conditions.

The cattail mat was remarkably adapted to its use as the exterior covering of a lodge. It was rain repellent, wind resistant, portable, pliable, obtainable, lightweight; and it employed the principle of insulation. It was sometimes used to line interior walls. As a secondary function it served as an auxiliary to transportation.

Birchbark mats frequently replaced cattails for lodge coverings because they were more durable, more easily made, lighter, less bulky, and cooler in summer. Cattail mats were warmer and therefore preferred for winter use.

(4) The technique used in the reed mat may be called knotted weft. The reeds are cut, stripped, trimmed, and bound side-by-side with a double weft of *wi'gōōb* knotted between every two reeds. Knotting produces an open texture that facilitates drying of foods on the mat. A straw-bundle mat is made by a variant of this technique.

(5) Braiding followed by spiral winding is the technique used in cattail and rush mats (both oval).

Even if adapted from European-type rugs of braided rags, these mats are interesting as an example of adaptation of familiar materials to a new technique. Similar mats are made of several materials by the Algonquin and Iroquois.

The plants are cut, and dried for 3 days. Rushes are sometimes killed with hot water. Three strands are braided, the length of the braid being determined by the size of mat desired. Braids are sewn together as they are wound into a spiral. A mat about 2 by 3 feet requires 5 hours of work.

Cattail mats are suitable for light use on the floor, while those of rush are used as table mats.

(6) The technique of coiling is employed in the sweetgrass mat. Sweetgrass is picked, cleaned, trimmed, and dried for use. A small bunch is coiled and sewn with needle and thread, the coils being bound together by an interlocking stitch. Frequently birchbark embroidered with porcupine quills is used for a center or between coils of grass. A zigzag open pattern is also sometimes interpolated or used as edging.

The questionable value of such a mat in a primitive culture casts doubt on its antiquity. This may be an adaptation of an old basket-making technique to a new use.

(7) Mats of unknown techniques were made from black ash and cedar strips, pine bark, cornhusks, and four small rushes: bog-rush, soft rush, Dudley's rush, and woolgrass.

Mat weaving died out among the Bungi after removal to the Plains.

A mat of narrow strips of birchbark was used in straining maple sirup. Presumably the technique was that used in birchbark gum-boiling bags: twined weave.

Several ambiguous descriptions of processes defy interpretation.

(8) In reviewing the list of mats, the variety of techniques, uses, colors, patterns, materials, and sizes is surprising. The mat was ubiq-

uitous; it accompanied the Chippewa literally from the cradle to the grave. A baby was delivered on a grass-covered mat (Hilger, 1951, p. 13) and was rolled in its cradle inside the family matting when the camp was moving (Densmore, 1929, p. 50). Later a mat provided a dry, smooth surface for working on damp ground (Hilger, 1951, p. 136) or in berrying or ricing (Lyford, 1953, p. 90). Finally, a mat might line and cover a Chippewa's grave (Hilger, 1951, pp. 80, 82).

Kohl leaves us this enthusiastic testimonial (1860, p. 11): "I confess such a new, clean wigwam, with its gay matting, looks very comfortable, especially when a fire is crackling in the centre, and such a house would amply satisfy a Diogenes" (pl. 59).

LITERATURE CITED

(Year in which observations were made is in *italic*)

BOYLE, DAVID.

1898. Notes on some specimens: textile work. *Ann. Rep. Minister Education Ontario, 1897-1898, Rep. Div. Archeol., pp. 15-34. Toronto. 1892.*

BROWER, J. V., and BUSHNELL, D. I., JR.

1900. *Memoirs of the explorations in the basin of the Mississippi. Vol. 3—Mille Lac. St. Paul, Minn. 1899.*

BUSHNELL, DAVID I., JR.

1919 a. Native villages and village sites east of the Mississippi. *Bur. Amer. Ethnol. Bull. 69.*

1919 b. Ojibway habitations and other structures. *Ann. Rep. Smithsonian Inst. for 1917, pp. 609-618. 1899-1900.*

1922. Villages of the Algonquian, Siouan, and Caddoan tribes west of the Mississippi. *Bur. Amer. Ethnol. Bull. 77.*

1940. Sketches by Paul Kane in the Indian country, 1845-1848. *Smithsonian Misc. Coll., vol. 99, No. 1.*

CHAMBERLAIN, A. F.

1888. Notes on the history, customs, and beliefs of the Mississagua Indians. *Journ. Amer. Folk-lore, vol. 1, No. 2, pp. 150-160.*

CLARK, W. P.

1885. *Indian sign language. . . . Philadelphia. 1878-1884.*

COLEMAN, SISTER BERNARD.

1947. Decorative designs of the Ojibwa of northern Minnesota. *Catholic Univ. Amer., Anthrop. Ser. No. 12. 1929-1945.*

COOPER, JOHN M.

1936. Notes on the ethnology of the Otchipwe of Lake of the Woods and of Rainy Lake. *Catholic Univ. Amer., Anthrop. Ser. No. 3. 1928.*

CRAFTS OF THE CREE.

1957. Beaver, Outfit 288, pp. 53-57. John Macfie, photographer. *Autumn. 1956.*

DENSMORE, FRANCES.

1918. Study of Chippewa material culture. *Smithsonian Misc. Coll., vol. 68, No. 12. 1917.*

1928. Uses of plants by the Chippewa Indians. *44th Ann. Rep. Bur. Amer. Ethnol., 1926-27, pp. 275-397. 1905-1925.*

1929. Chippewa customs. *Bur. Amer. Ethnol. Bull. 86. 1905-1925.*

GILFILLAN, Joseph A.

1901. The Ojibways in Minnesota. Coll. Minnesota Hist. Soc., vol. 9. 1873.

GILMORE, MELVIN R.

1933. Some Chippewa uses of plants. Michigan Acad. Sci., Arts and Letters Pap., vol. 17 (1932), pp. 119-143. 1933.

HENRY, ALEXANDER.

1897. New light on the early history of the greater northwest. The manuscript journals of Alexander Henry . . . and of David Thompson. . . 1799-1814. Vol. 1, The Red River of the North. Ed. by Elliott Coues. New York. 1800.

HILGER, SISTER M. INEZ.

1935. Indian women preparing bulrush mats. Indians at Work, vol. 2, No. 22.
1939. A social study of one hundred fifty Chippewa Indian families of the White Earth Reservation of Minnesota. Catholic Univ. America, Washington, D.C. 1938.
1951. Chippewa child life and its cultural background. Bur. Amer. Ethnol. Bull. 146. 1932-1940.

HOFFMAN, WALTER JAMES.

1896. The Menomini Indians. 14th Ann. Rep. Bur. Ethnol., 1892-93, pt. 1, pp. 3-328. 1890-1893.

HOLMES, W. H.

1896. Prehistoric textile art of eastern United States. 13th Ann. Rep. Bur. Ethnol., 1891-92, pp. 3-46. 1890-1893.

JENKS, ALBERT ERNEST.

1900. The wild-rice gatherers of the upper lakes. 19th Ann. Rep. Bur. Amer. Ethnol., 1897-98, pt. 2, pp. 1013-1137. 1899.

JENNESS, DIAMOND.

1932. Indians of Canada. Nat. Mus. Canada Bull. 65.
1935. The Ojibwa Indians of Parry Island, their social and religious life. Nat. Mus. Canada Bull. 78, Anthropol. Ser. No. 17. Ottawa. 1929.

JOHNSON, FREDERICK.

1929. Notes on the Ojibwa and Potawatomi of the Parry Island Reservation, Ontario. Mus. Amer. Ind., Heye Found., Ind. Notes, vol. 6, pp. 193-215.

JONES, REV. PETER.

1861. History of the Ojebway Indians. . . London. 1802-1856.

JONES, VOLNEY H.

1936. Some Chippewa and Ottawa uses of sweet grass. Michigan Acad. Sci., Arts and Letters Pap., vol. 21 (1935), pp. 21-31. 1933-1934.
1937. Notes on the preparation and the uses of basswood fiber by the Indians of the Great Lakes region. Michigan Acad. Sci., Arts and Letters Pap., vol. 22 (1936), pp. 1-14. 1933.
1948. Notes on the manufacture of cedar-bark mats by the Chippewa Indians. Michigan Acad. Sci., Arts and Letters Pap., vol. 32 (1946), pp. 341-363. 1933.

JONES, WILLIAM.

1906. Central Algonkin. Ann. Rep. Minister Education Ontario, 1905, Rep. Div. Archeol., pp. 136-146. Toronto.

KANE, PAUL.

1859. Wanderings of an artist among the Indians of North America. . . .
London. 1845-1848. [1925 ed., The Radisson Society of Canada,
Toronto.]

KEATING, WILLIAM H.

1825. Narrative of an expedition to the source of St. Peter's River. . . .
London. 1823.

KIDD, KENNETH.

1946. Wanderings of Kane. Beaver, Outfit 277, pp. 3-9. December. 1846-
1848.

KINIETZ, W. VERNON.

1947. Chippewa village, the story of Katikitegon. Cranbrook Inst. Sci. Bull.
No. 25. Bloomfield Hills, Mich. 1939-1940.

KINIETZ, W. VERNON, and JONES, VOLNEY H.

1942. Notes on the manufacture of rush mats among the Chippewa. Michigan
Acad. Sci., Arts and Letters Pap., vol. 27 (1941), pp. 525-538. 1933-
1940.

KOHL, JOHANN G.

1860. Kitchi-Gami, wanderings round Lake Superior. London. 1855.

LONGFELLOW, HENRY WADSWORTH.

1893. Song of Hiawatha. Chicago.

LYFORD, CARRIE A.

1945. Iroquois crafts. Education Division, U.S. Indian Service, Indian
Handcrafts 6. Lawrence, Kans.
1953. Ojibwa crafts (Chippewa). Education Branch, U.S. Bur. Indian
Affairs, Indian Handcrafts 5. Lawrence, Kans.

McKENNEY, THOMAS L.

1827. Sketches of a tour to the lakes. . . . Baltimore. 1826.

MASON, OTIS TUFTON.

1904. Aboriginal American basketry. Rep. U.S. Nat. Mus. for 1902, pt. 2,
pp. 171-548.

MOONEY, JAMES, and THOMAS, CYRUS.

1907. Chippewa. In "Handbook of American Indians north of Mexico." Ed.
by Frederick Webb Hodge. Bur. Amer. Ethnol. Bull. 30, pt. 1,
pp. 277-282.

PARKER, CAROLINE.

- Mat weaving with different materials. Great Lakes Indian Agency,
Ashland, Wis., WPA Project on the Chippewa Indians, folder 8,
item 6, 1936-40. [Copy of unpublished material furnished to this
writer by St. Mary Indian School, Odanah, Wis.]

RADIN, PAUL.

1923. The Winnebago tribe. 37th Ann. Rep. Bur. Amer. Ethnol., 1915-16,
pp. 35-560. 1908-1913.
1928. Ethnological notes on the Ojibwe of southeastern Ontario. Amer.
Anthrop., n.s., vol. 30, pp. 659-668. 1912-1916.

REAGAN, ALBERT B.

1924. The Bois Fort Chippewa. Wisconsin Archeol., n.s., vol. 3, No. 4, pp.
101-132. 1922?
1928. Plants used by the Bois Fort Chippewa (Ojibwa) Indians of Min-
nesota. Wisconsin Archeol., n.s., vol. 7, No. 4, pp. 230-248. 1922?

SCHOOLCRAFT, HENRY R.

1853. Information respecting the history, condition and prospects of the Indian tribes. . . . Vol. 2. Philadelphia.

SEYMOUR, E. S.

1850. Sketches of Minnesota. . . . New York. 1849.

SKINNER, ALANSON.

1911. Notes on the Eastern Cree and the Northern Saulteaux. Amer. Mus. Nat. Hist. Anthropol. Pap., vol. 9, pt. 1. 1909.
1914. The cultural position of the Plains Ojibway. Amer. Anthropol., n.s., vol. 16, pp. 314-318. 1913.
1921. Material culture of the Menomini. Mus. Amer. Ind., Heye Found., Notes and Monographs, Misc. Publ. No. 20. 1919-1920.
1926. The Mascoutens or Prairie Potawatomi Indians. Bull. Public Mus., City of Milwaukee, vol. 6, No. 2, pp. 263-326. 1923.

SMITH, HURON H.

1923. Ethnobotany of the Menomini Indians. Bull. Public Mus., City of Milwaukee, vol. 4, No. 1, pp. 1-174. 1921-1922.
1925 a. The Red Earth Indians. Yearbook Public Mus., City of Milwaukee, for 1923, vol. 3, pp. 27-38. 1923.
1925 b. Botanizing among the Ojibwe. Yearbook Public Mus., City of Milwaukee, for 1923, vol. 3, pp. 38-47. 1923.
1928. Ethnobotany of the Meskwaki Indians. Bull. Public Mus., City of Milwaukee, vol. 4, No. 2, pp. 175-326. 1923.
1932. Ethnobotany of the Ojibwe Indians. Bull. Public Mus., City of Milwaukee, vol. 4, No. 3, pp. 327-526. 1923-1932.

SNELLING, WILLIAM JOSEPH.

1936. William Joseph Snelling's tales of the Northwest. Minneapolis. 1800-1825.

TANNER, JOHN.

1830. A narrative of the captivity and adventures of John Tanner Ed. by Edwin James. London. 1790-1820.

THAYER, B. W.

1935. A comparison of Dakota and Ojibway steel implements with their prehistoric equivalents. Minnesota Archeol., vol. 1, No. 6, pp. 1-6.
1940. Some Indian bone artifacts of the historical period from Minnesota and surrounding area. Minnesota Archeol., vol. 6, No. 3, pp. 93-109.

THOMPSON, DAVID.

1916. David Thompson's narrative Ed. by J. B. Tyrrell. Champlain Soc. Publ. 12. Toronto. 1798.

WARREN, WILLIAM W.

1885. History of the Ojibways . . . 1784-1812. Coll. Minnesota Hist. Soc., vol. 5, pp. 21-394.

WATERMAN, T. T.

1925. North American Indian dwellings. Ann. Rep. Smithsonian Inst. for 1924, pp. 461-485.

WHIPPLE, RT. REV. HENRY BENJAMIN.

1902. Lights and shadows of a long episcopate New York. 1859-1899.

WILLOUGHBY, CHARLES C.

1905. Textile fabrics of the New England Indians. Amer. Anthrop., n.s.,
vol. 7, pp. 85-93.

WINCHELL, N. H., EDITOR.

1911. The aborigines of Minnesota St. Paul. 1879-1911.

WISSLER, CLARK.

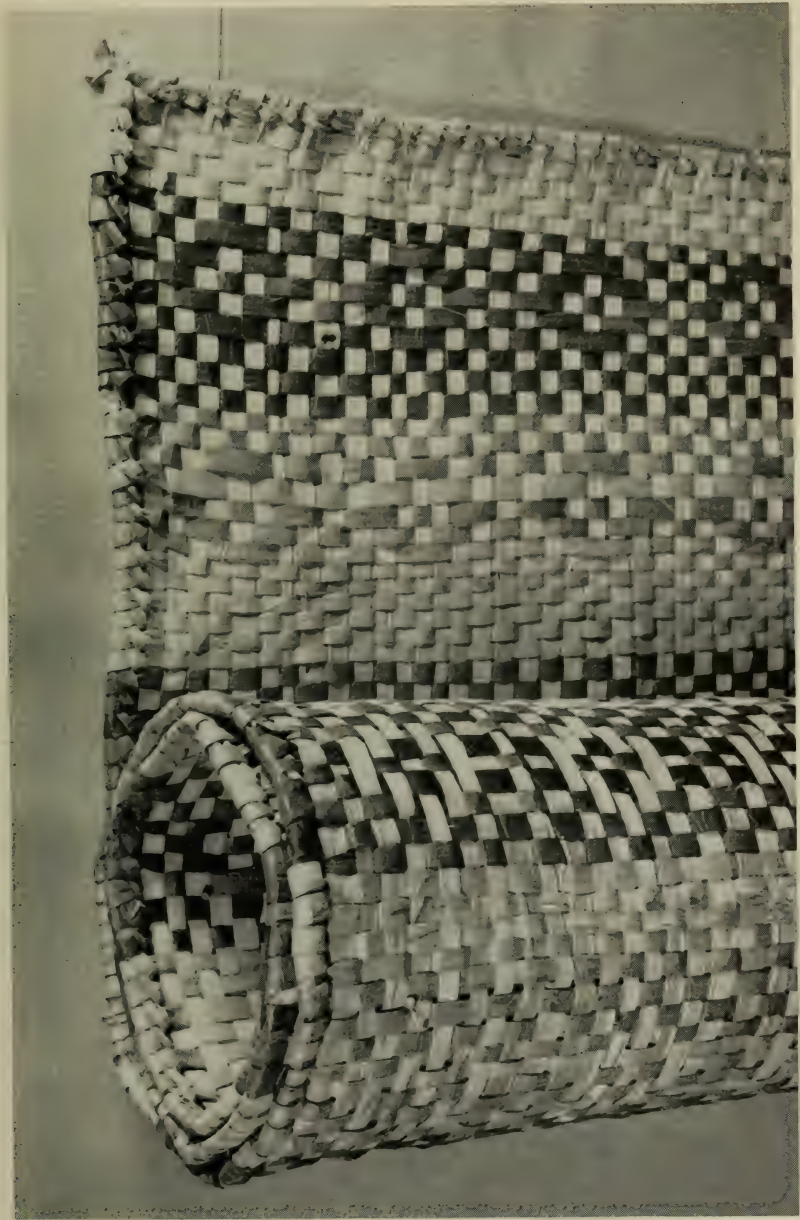
1931. The American Indian, an introduction to the anthropology of the
New World. New York.



Cedar-bark mat: Preparing strips. *a*, Mrs. Robert Strong pulling inner bark away from outer; stripped tree in back. *b*, Mrs. Peter Goodsky splitting strips. *c*, Removing two bunches of strips from dye bath. *d*, Weaving a bag from fragments; mat strips at rear.



Cedar-bark mat weaving. *a*, Adding a strip to selvedge. *b*, Position of left hand during weaving.



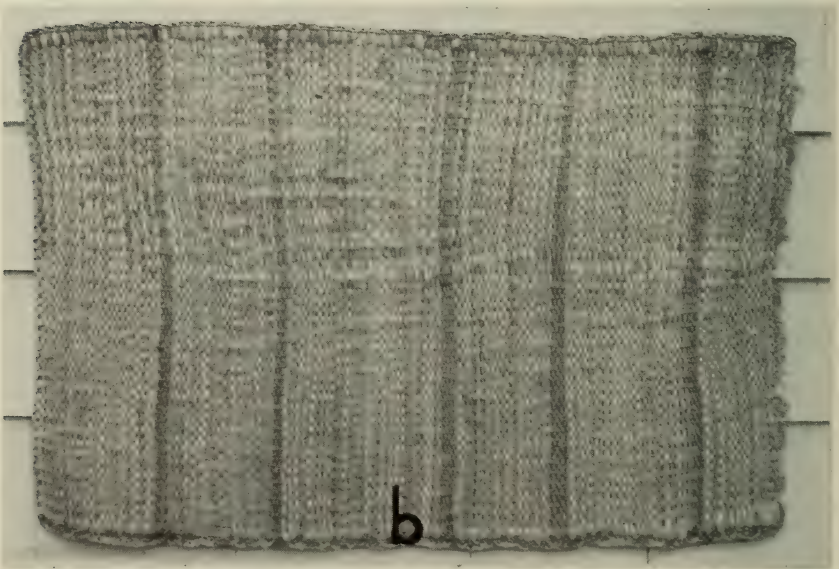
Cedar-bark mat detail. Unrolled portion shows right side; rolled portion shows back of mat. Corner is point where work ended.



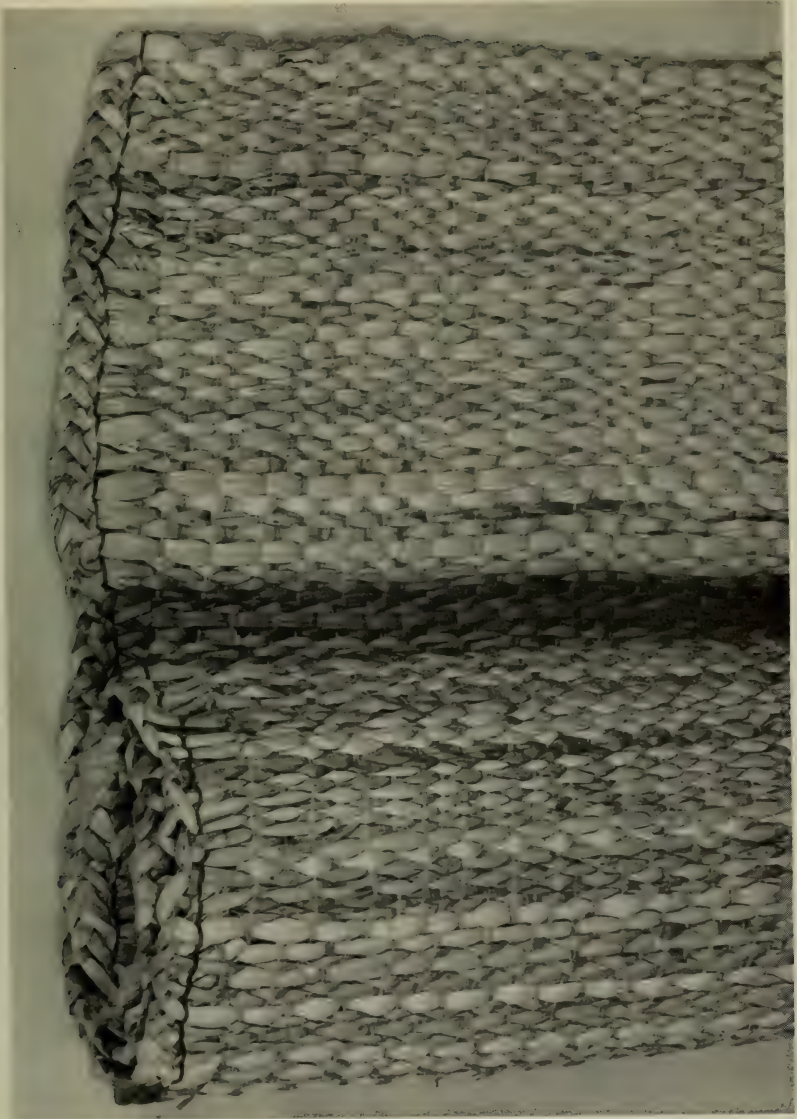
a, Completed cedar-bark mat on frame. *b*, Materials for mats: undyed and dyed cedar-bark strips, prepared and unseparated cattail leaves, treated bulrushes, deer-rib and wooden needles for sewing cattail mats.



Rush mat. *a*, Mrs. Ole Sam and Mrs. Maggie Skinaway Wadena crushing bloodroots for dye. *b*, Mrs. Sam "cooking" bulrushes. *c*, Adding rushes to the selvedge.



Rush mat. *a*, Karen Sam and Mrs. Selma Nickaboine weaving. *b*, Completed striped mat showing uneven area where rushes were dry.



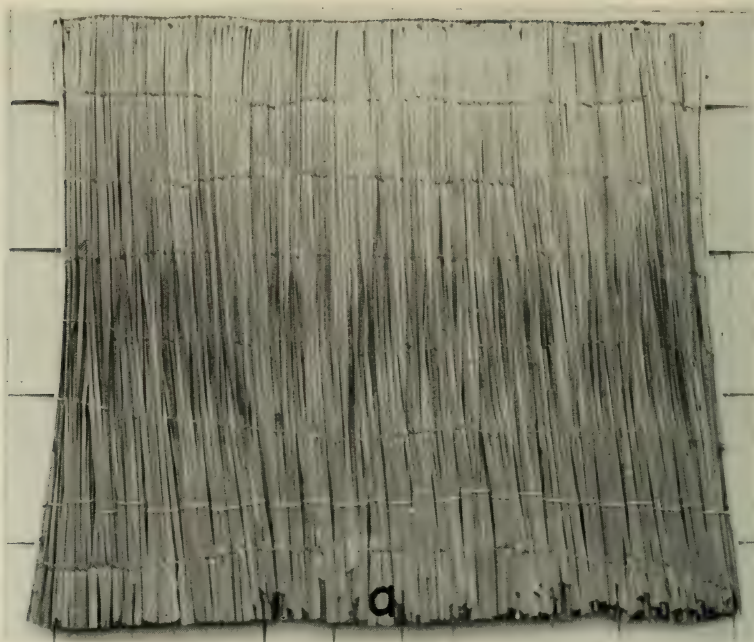
Rush mat detail. "Four-braid" edge appears the same on back and front.



Making a cattail-mat wigwam cover. *a*, Mrs. Wadena tying a leaf into the selvage. *b*, Beginning the sewing of the mat.



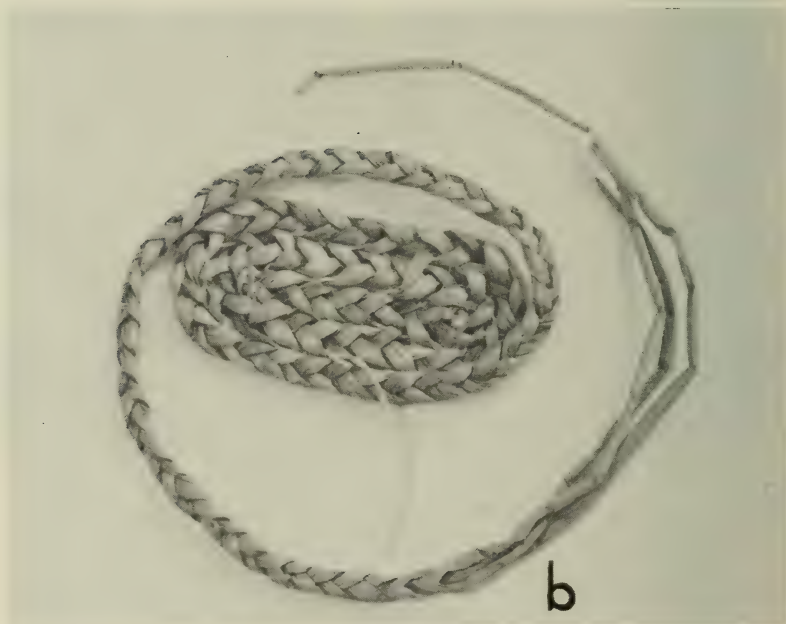
Cattail mat detail. Unrolled and rolled portions show two sides of mat each a separate layer. One row of sewing may be seen.



Cattail mat completed. *a*, Short demonstration mat. *b*, Full mat on wigwam. (Courtesy of the Science Museum, St. Paul, Minn.)



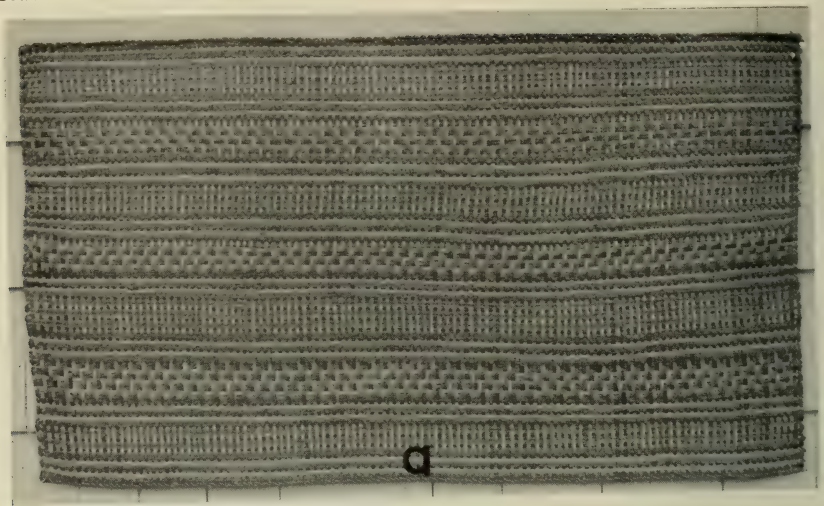
Braided cattail floor mat. *a*, Mrs. John Benaise peeling *wi' goōb* from basswood sapling.
b, Completing sewing of mat.



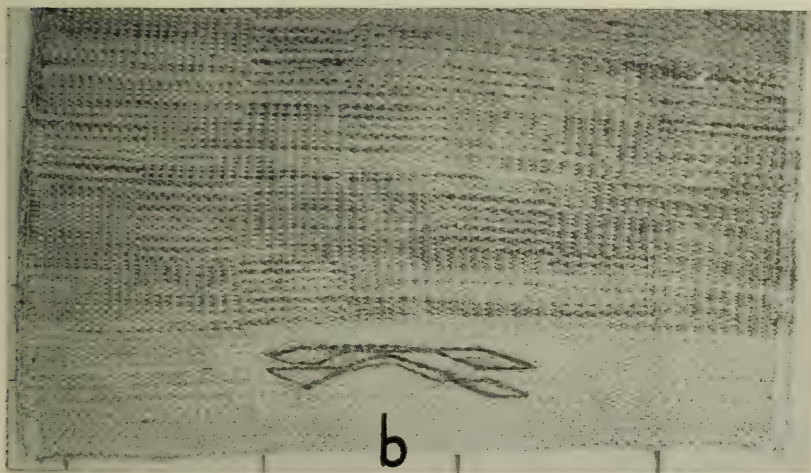
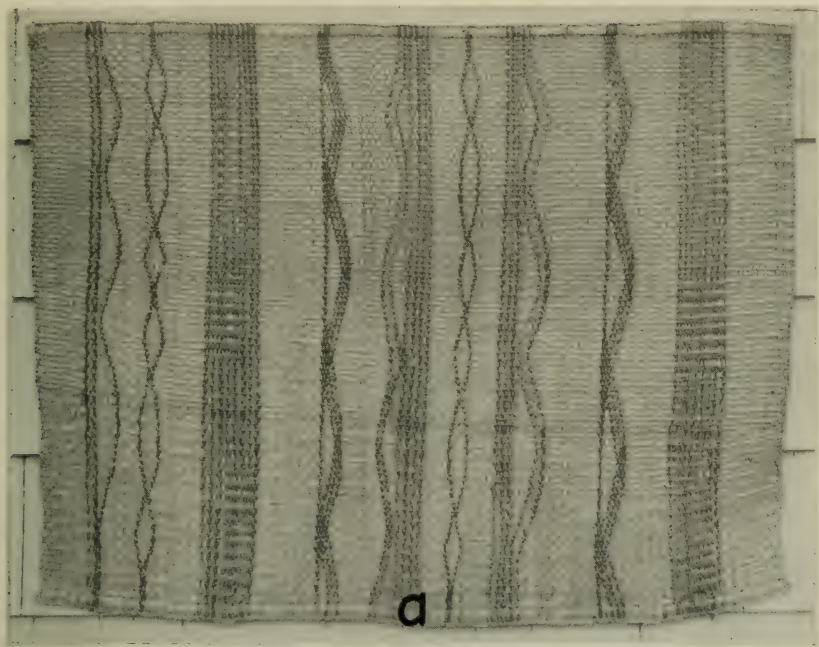
Braided mats. *a*, Cattail mat. *b*, Detail of beginning of small bulrush mat.



Sweetgrass bundle, old tablemat of sweetgrass and birchbark ornamented with dyed quills (collections of the Science Museum, St. Paul, Minn.), and mat of sweetgrass.



Cedar-bark mats made at Nett Lake Reservation in the period of this study. *a*, Geometrical pattern by Mrs. Charles Strong. *b*, Plaid by Mrs. Peter Goodsky.



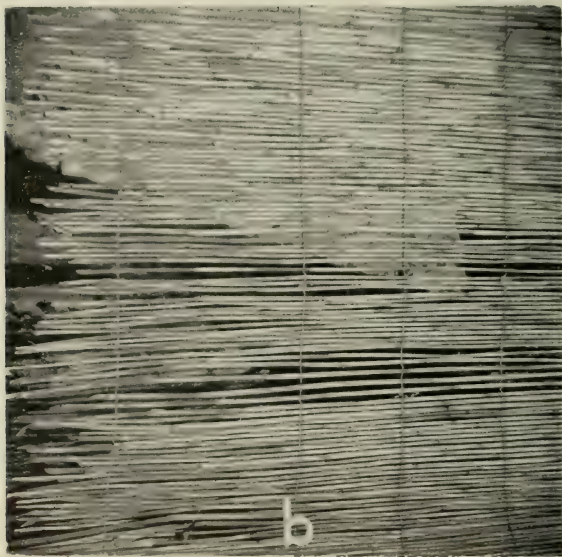
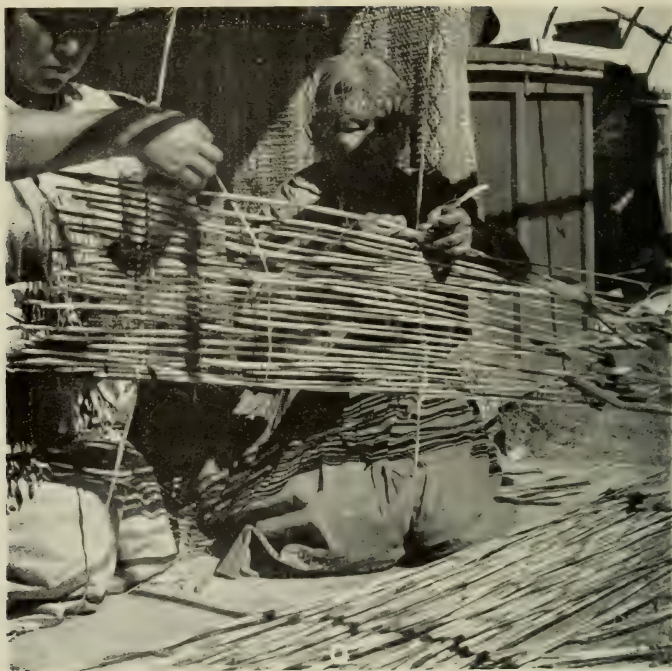
Old rush mats. *a*, Zigzag patterns including otter-tail pattern, and block pattern.
b, Floral (?) pattern and blocks, from Ponsford, White Earth Reservation.



Rush mat used to line the wall of a birchbark peaked lodge, in a painting done by Eastman Johnson at Grand Portage Reservation, Minnesota Territory, 1857-58. (Courtesy of the St. Louis County Historical Society, Duluth, Minn.—cat. No. 10.)



Wigwam showing mats in use. Rear and foreground floor, cedar-bark mats. At sides, rush mats. On walls, cattail mats. (Courtesy of the Science Museum, St. Paul, Minn.)



Reed mat. *a*, Mrs. Susan Shingobe and Mrs. Maggie Nequonabe weaving. *b*, Section of mat used for drying blueberries near Pickle Lake, Ontario, Canada.

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